Developing and Instituting a Design-Build Alternative Permitting Protocol for DHEC's Water Supply and Recreational Waters Permitting Section

2008 Certified Public Manager Project Report

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Water Supply and Recreational Water Permitting Section
Bureau of Water, SCDHEC

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Developing and Instituting a Design-Build Alternative Permitting Protocol for DHEC's Water Supply and Recreational Waters Permitting Section

I. Problem Statement

The Water Supply and Recreational Waters Permitting section of the Department of Health and Environmental Control's (DHEC's) Bureau of Water (BOW) has historically had the responsibility of reviewing and approving public water supply projects throughout the state. DHEC's motto is "Promote, Protect and Prosper" with the intent of promoting public health, protecting the environment, and to help the citizens of South Carolina to prosper. Along with this intent, the goal of the Bureau of Water is "Working to ensure high quality drinkable, fishable and swimmable waters throughout South Carolina." So, given this motto and goal, it is the responsibility of the Water Supply and Recreational Waters Permitting Section to ensure that all new public water supplies and treatment plants produce high quality drinking water, thus ensuring that the public's health is protected.

The construction of water supply facilities has traditionally been handled through the "Design–Bid–Build" (DBB) method proscribed in regulation 61-58, the State Primary Drinking Water Regulations, under section R.61-58.1B(3), with DHEC's involvement typically being limited to the project review and permitting between the "Design" and "Bid" phases. This method is effective, but can be time consuming, and works best when the time frame for the project is not critical.

For a complex project, (i.e., a surface water treatment plant) this method can take from one to three years to go through the process of the water system selecting an engineering firm, and the water system and design engineer deciding on the size and type of treatment plant required to meet the water system future needs. Once the design is completed, the design engineer submits the completed application package to DHEC for review and permitting. The

DHEC Water Supply engineer will review the project to ensure that it is in compliance with regulation 61-58. If portions of the project are not in compliance, then the Water Supply engineer will write to the design engineer with a list of questions that were not addressed in the submittal. If the design engineer's reply does not address these questions, then correspondence will continue until all of the regulatory issues have been addressed, then the Water Supply engineer will issue the permit.

While at DHEC, the project review must be completed within fifty-five days of the receipt of a completed project. Once a review letter is sent out, the fifty-five day clock is stopped until a complete reply is received, then it picks up where it left off. On larger projects, the review portion can take up to a year to complete if there are complex issues or disagreements that need to be addressed. This delay can add considerable cost to a treatment plant, and indirectly increase the amount a water system's customers must pay for their water bill. The old adage that "time is money" is true in the construction industry, and the delay of a couple of years can cause the project bid cost to increase dramatically.

Richland County Utilities had planned on constructing a wastewater treatment plant that would be operational in 2005. They received bids for this plant in the neighborhood of $15 million. The plant construction was delayed due to the bids coming in over budget. Currently the county is constructing the wastewater treatment plant due to be operational in 2009 at a contract cost of $29 million. This four year delay has caused an increase of $14 million of additional debt service that the utilities customers must pay back.

Alternate permitting methods have been proposed to reduce the overall project timeframe for large scale and complex projects. The "Design-Build" (DB) and "Construction Manager" methods are two of the alternatives that have been proposed to reduce the overall timeframe of a

project. This paper will focus on the "Design-Build" approach. Using the DB method can reduce the design and permitting cost from approximately eighteen months using the traditional DBB method, to approximately six to nine months using the DB method. This could lead to a substantial cost saving to the utility and their customers.

In the past couple of years, DHEC's deputyship, Environmental Quality Control (EQC) has been pushing the concept of "expedited permitting" to reduce the overall project review time for certain type of projects. This has been limited to stormwater projects, water line projects, and sewer line projects and it is only available upon request by either the owner, or the design engineer. The idea of expedited permitting is to have the sections most experience engineers review and permit a project within 10 days as opposed to the allotted 20 days for stormwater projects and 55 days for a water line or sewer line projects. Strict limitations have been placed on this program, and only projects of the highest quality are eligible for expedited review status. Along with these restrictions, and additional project review fee is required.

While the DB method would not be appropriate for more straightforward projects, it could allow for more complex projects to be permitted in the timeframe of a week or two. This method would require numerous meetings with the water system, the selected design firm, and eventually the construction company. Rather than the Water Supply engineer spending days or weeks to delve through a water treatment plant by the various unit processes, time would be spent working with the various groups in the design phase so that all of the design and technical issues are addressed prior to the project being submitted to DHEC. This collaborative approach has been used successfully on two projects in the past, with a permit timeframe of ten days compared to close to a year for similar projects.

What are the potential benefits, if any, to using the DB method of permitting a project compared to using the traditional DBB method of permitting a project? Would this approach save the utility and its customer's time and money, or waste both?

II. Data Collection

The desired goal of the surveys used as part of the data collection would be to determine what, if any, aspects of the traditional DBB process would need to be modified in order to minimize the overall project timeline. From the project case studies, determine what factors contributed to either the ease of approval, or were the cause of the delay within the permitting process. This combined data should allow for a determination of whether or not the DB method would reduce the overall project time frame, not just the DHEC permitting time frame.

A. Definitions[1]

Construction Manager - Construction managers provide oversight and scheduling services to the owner, for the most part during the actual construction process. This type of service is sometimes referred to as agency construction management, to distinguish it from a type of general contracting known as at-risk construction management.

Design Build – Design-builders are similar to general contractors. However, in a design-build project a single contract is signed with the owner that makes the contractor responsible for providing the architectural and engineering designs. The design-builder therefore is responsible for the design of the project as well as its construction.

1. Industry Canada "Definition Construction" retrieved November 30, 2007, http://www.ic.gc.ca/canadian_industry_statistics/cis.nsf/IDE/cis23defe.html

B. Case Studies

The first case study is Greenville Water System's Dissolved Air Floatation (DAF) Water Treatment Plant was the first project to bring the DB approach to the Bureau of Water. The project was received on *June 17, 1996*, and the Permit to Construct was issued on *June 27, 1996.* The DHEC time clock on had 10 days versus the 55 days that is allowed. The manager of the section, and the review engineer attended numerous meeting with the utility, their design engineer, and their builder in order to work through the proposed design, and ensure that it was in compliance with the regulations. Construction was complete, and the 75 million gallon per day (MGD) water treatment plant was approved for operation in July 2000. Based on conversations with DHEC's section manager who participated in the project meeting for this project, the meetings were focused on the goal of obtaining a surface water treatment plant that met the EPA and DHEC regulations for safe drinking water, and that could be completed within the required timeframe in an affordable manner. No wasted time on extraneous activities or fluff. Also, at the time, the permitting and compliance programs were in the same section, and the permitting engineer also performed the compliance inspections of the water system.

The second case study is of Greenville Water System's Adkins Water Treatment Plant upgrade. This was the second DB project brought to the Bureau of Water. The project was received on September 21, 2000, and was permitting on December 6, 2000. The permitting took 77 days, with a total of 14 days on the DHEC time clock. Again DHEC participated in the design meetings prior to the project being submitted for review and permitting. The parties involved this time consisted of the compliance manager and permitting engineer, Greenville Water System, and their construction company, which acted as both the designer and builder for this project. Construction was completed on upgrade from 30 MGD to 60 MGD, and the plant

was approved for operation in January 2005. Again, based on conversations with DHEC's compliance section manager who participated in the project meetings for this project, the meetings did achieve the intended goal, but time was wasted on team building techniques in an attempted to build camaraderie. The same outcome could have been achieved sooner if less time had been wasted.

The third case study is based on Richland County's Wastewater Treatment Plant. The plant was originally planned for completion in July 2005, but bids came in near $15 million, and were deemed to be too expensive. The project was put on hold, and when the contract for the plant was finally signed, the bid was for $29 million, with a completion date of January 2009. Over the four years between the original 2005 completion date and the current 2009 completion date, concrete costs increased approximately 65%, while steel costs have increases approximately 78%.

The fourth case study is the Saluda County Surface Water Treatment Plant. This project was received on August 30, 2004, and was permitted on August 4, 2005. DHEC was not involved in any meetings or discussions with either Saluda County, or their engineer prior to the submittal of the project. The review process required numerous letters, the first of which consisted of 114 questions, many of which had multiple sub-questions. The project required a major revision to meet the current regulations, and to date, construction has not started on this water treatment plant.

The fifth and final case study is of Hilton Head Public Service District #1's new Reverse Osmosis Water Treatment Plant. The project was received on July 31, 2007, and was permitted on December 7, 2007. While the plans were labeled as "Design-Build" DHEC's Bureau of Water was not involved in any meetings or discussions with the utility, or the design engineers.

The review process required two letters, the first of which had twenty-three questions, with one question having eight sub-questions, and the second letter having six questions. One of the reasons the permit was delayed was due to a miscommunication between the utility, and its two design firms. Each design firm thought the other was responsible for the wastewater outfall structure.

C. Surveys

Also, a survey was sent out to a workgroup comprised of engineering firms, construction firms, and utilities that have experience with the Design-Build process. Their responses are located in Appendix 3.

D. Data Analysis

Based on the case studies, communication between DHEC's Bureau of Water, and the water system, the design engineering firm, and the construction contractor is critical to reduce the overall timeframe and cost of the project. In two of the five case studies, where DHEC's staff was not involved in the upfront discussions, the permitting timeframe for these projects were slowed down by numerous regulatory deficiencies. These deficiencies could have been discussed and resolved prior to the project submittal if the utilities and design firms had met with DHEC. As far as the old adage "time is money" is concerned, the four year delay will end up costing the citizens served by the Richland County wastewater plant an extra $14 million, or 93% more than the original cost.

Based on the surveys, one option to the traditional permitting approach is to go with a "phased permitting" approach in which permits are issued as various portions of the design are completed. This would allow construction to start much earlier than with the typical permitting approach. Also mentioned repeatedly was the fact that the Design-Build approach typically

reduces the construction schedule, and thereby decreases the cost of the project. It should be noted that not all projects are suited for using the Design-Build approach. For a simple, straightforward project it may not be possible to save either time or money using the Design-Build approach.

Based on the data from the surveys and case studies, DHEC should formalize a DB approach to project construction and permitting as an alternative to the traditional DBB approach. While the DB approach typically does not involve a regulator as a formal team member, DHEC, if asked, should willingly attend project meetings and work with the Design-Build team to address regulatory concerns. This would ensure that the project, when it is submitted would already meet the current regulations, and it also would greatly reduce the time required to review the project and issue a permit. This would offer the utilities the potential for even greater timesavings, and potentially reduce the overall project cost. Please note that this should only be an alternative to the traditional DBB approach to project construction, and that only a handful of large scale projects are received each year.

III. Implementation Plan

A. Action Steps

A Buy-in from upper management would be necessary to proceed with any new program. This would be handled by me via a presentation to the Bureau Chief, Assistant Bureau Chiefs, and the Water Facilities Permitting Division Director.

B Develop a Standard Operating Procedure (SOP) that would incorporate a list of recommendations from the Water Supply permitting and compliance programs addressing what projects would likely benefit from the DB approach. The SOP

would also include a list of likely DHEC contacts/attendees, depending upon the type of project to be constructed.

C Staff buy-in will be necessary in order for this alternative to succeed. This should be reasonably obtainable by presenting the concept, and explaining that staff would be involved on the front end of project, and would have the opportunity to provide input during the design. This would allow them to reduce the time it currently take them to review a project. While time would be spent on the front end, it would be offset by not having to review a new design from scratch.

D Disseminate the SOP to the various engineering firms and utilities that would benefit. This could be done via a mailout to any engineering firm that has submitted a project for a surface water treatment plant or a ground water treatment plant requiring advanced treatment in the past two years.

E Use the DHEC website for the Bureau of Water to post the SOP so that it is available to any interested parties. This would be a web page explaining the alternative DB approach, and have links to the SOP, as well as the DHEC contacts listed in the SOP.

F Present the SOP at the 2008 annual South Carolina Environmental Conference (SCEC). Preparations have been made for a DB discussion/presentation to take place at the conference.

B. Timeframes and Cost

A The SOP should be completed one week after the submission of the CPM project, by Feb 11, 2008. At this time, it will be presented to the Water Facilities Permitting Division Director for his review and approval.

B One week after the SOP is completed; make any revisions as required by the Division Director, and request permission to present it to the Bureau of Water's upper management at the next weekly Director's meeting, on or about Feb 19, 2008. After this meeting, make any changes required by upper management, and submit it for final approval, if required.

C Two weeks after the SOP is approved, mail out the SOP to the appropriate engineers and all utilities using surface water treatment plants or ground water using advanced treatment. Also post the SOP on the DHEC website at this time. This would take place on or about March 4, 2008.

D Be prepared to discuss the SOP at SCEC on April 1, 2008.

E There would be no additional cost to DHEC to implement this alternative permitting approach. If upper management decides to implement a phased permitting approach, then it may cost the utilities an additional review fee for each of the phased permits they obtain. Otherwise, one construction permit would be issued at no additional cost to the utility. The project review fee currently covers cost of the engineer's time once the project is submitted to DHEC. Using the DB approach, the review fee would cover the cost of the review engineer's time spent meeting with the water system, design engineer and/or contractor with only a minimal amount of time being spent reviewing the project once it has been submitted.

C. Potential obstacles and methods to overcome them

A As with anything new, staff resistance to change is always a concern. While this cannot be completely avoided, it can be overcome by achieving buy-in from

upper management, and from the various experienced staff. For the others that are still reluctant, they will be able watch the process and see if it can be successful.

B Some water systems will chose to stay with the traditional design-bid-build method of constructing a treatment plant rather than the Design-Build approach. The Design-Build method is not intended for all projects or all water systems. There are risks involved, and its use requires a good working relationship between the utility, the design firm, and the contractor. If the relationship is not present, the Design-Build method would not be a viable option for this water system.

D. Available Resources

A DHEC currently operates a website that provides information to the public. This can be used to disseminate the DB SOP to any engineering firms, water systems, or contractors who are interested. Currently the website provides links to the State Primary Drinking Water Regulations, and various guidance documents and form necessary to apply for a permit to construct.

B The Water Supply and Recreational Water Permitting section currently has checklist available for every type of water supply or treatment project that we have permitted in the last decade. These checklists can be made available on the DHEC website for any one to access.

E. Communication with key stakeholders

A After approval from the Bureau of Water's upper management, I can meet with the review engineers, and other DHEC staff that would be involved in the meeting with the water system, design engineer, and contractor. At this meeting, I would

explain the DB concept, and how it could expedite the review process, and still ensure that the design meets the regulations and protects the citizen of SC.

B After meeting with other DHEC staff, I would send out letters explaining the DB alternative and the SOP to all water systems that are using surface water treatment plants or ground water sources using advanced treatment as well as engineering firms that have worked on these plants within the past two years.

C I would be available to discuss the SOP at SCEC conference on April 1, 2008, and I would post the SOP on website.

F. Integration into Standard Operating Procedures

The DB method for construction would be an alternative to the traditional DBB method of constructing a water treatment plant. The SOP for the DB method would only be used for projects in which the utility has decided to invite DHEC to be part of the plant design, and would not be forced on any applicant. It would act as a stand alone alternative to the typical project path.

IV. Evaluation Method

The method used to evaluate the effectiveness of the DB method would be two-fold. The first would be to use the existing customer service survey form that the Bureau of Water currently uses. This would allow direct feedback from the utility, and the design engineer on their opinions of DHEC's efforts, and would allow them to comment on the effectiveness of the DB alternative. The second would be to review the permit timeframes of projects that used the DB alternative. This would allow for an objective review of the time it took for DHEC to issue a

Permit to Construct, along with allowing for a review of what, if any issues were not addressed in the pre-submittal meetings.

V. Summary and Recommendation

The DB alternative would allow for a utility to save time and money when constructing a new water supply plant. While it is not ideal for most of the permits submitted to DHEC, it may be useful for larger, more complex projects that require extensive planning and extended timeframes to construct. If the utility desires to use the DB method to construct a treatment plant, DHEC should not only allow them to do so, but should be willing to meet with the utility, their design engineer, and their contractor to address the regulatory requirements prior to the completed design being submitted for approval. Ideally this would allow the engineer to develop a design that is in compliance with the regulations, and reduce the overall permitting and construction timeframe. To this end, DHEC should develop a DB SOP and protocol that would assist the utility in designing a treatment plant that not only provides safe drinking water, but also can be constructed at a lower cost. This would allow the water system to charge a lower rate to their customers, thus making everyone happy.

If the DB alternative is successful with water supply projects, then the concept could be easily extended to include wastewater treatment plants, and then possible to other program areas within the agency.

Appendix 1 – Joint Interview

Joint Interview with Raymond F. Peterson, P.E., Deputy Director of Utilities for Richland County, and Joseph Rivers, Superintendent of Operations for Richland County
January 28, 2008

Question: After a long delay, Richland County is building a new Waste Water Treatment Plant (WWTP), what is the current cost and time line versus the original cost and timeline?

Answer - RFP: The original plant had a proposed completion date of July 2005, and was the bids came in around $15 million. At the time, the cost was thought to be too high, so the plant was delayed.

The plant is currently under construction and is scheduled for completion in Jan 2009, and the contract is for $29 million. During the past 4 years, concrete costs have increased about 65%, while steel costs have increases about 78%.

Question: Are you familiar with Design Build, and similar Alternate Delivery Methods, and if so does Richland County plan on using them in the future?

Answer – RFP: Yes, we've looked into Design Build.

JR: We are looking at using Design Build for the Hopkins Sanitary Sewer System. It will either be a full blown WWTP, or a forcemain that runs to the Eastover WWTP.

RFP: We were quoted $14.5 million for a plant back in 2005 using the traditional process, and were recently quoted a cost of $9 million for the plant using a contractor who specializes in Design Build. (These costs did not include disinfection for either the 2005 quote or the 2008 quote).

Question: Based on your experience so far, what do you think of Design-Build versus the traditional Design-Bid-Build process?

Answer – JR: The Design-Build process saves on headaches versus the traditional method.

RFP: The main benefit in Design-Build would be to get DHEC involved upfront, at around the 30% plan stage.

JR: Operations is brought into the discussion when using Design-Build, while the traditional design process does not usually include operations. Instead of [operations] being told the type of facility and how to run it, Design-Build let operations have input up front [in the design process].

Question: How does the planning and design timeline differ with Design-Build versus the traditional Design-Bid-Build process? And, what recommendations do you have for using Design-Build?

Answer – RFP: It takes about 18 months for planning and permitting of a WWTP using the traditional method. It would take between 6-9 months for planning and permitting for a WWTP using the Design-Build method.

If using the Design-Build approach, the initial meeting between the owner, the engineer and contractor, and DHEC should involve multiple DHEC representatives. For a

WWTP, it should include the engineers, wasteload allocation, and the NPDES modelers. For a SWTP, it should include the permit engineers, compliance engineers, and the source water protection group. As the meetings progress, the DHEC members can be reduced as questions are addressed and finalized.

Question: But you wouldn't recommend Design-Build for all projects would you?
Answer-JR: Design-Build is not ideal for all projects. For a small straight forward project, either a water line or a gravity sewer line it is not necessary, but for a treatment plant, it can save time and money.

RFP: We've talked to XYZ construction company, and they were interested in using Design-Build for the forcemain from Hopkins to Eastover. Given the size and length of the line [over 9 miles across flat ground and a wetlands], they said that they could save us a considerable amount. So, even if it is not a treatment plant, Design-Build can save some money if the project is large, or involves some complex environmental issues.

Appendix 2 - Case Studies

Case Study One - Dissolved Air Floatation (DAF) Water Treatment Plant

South Carolina
DHEC
Department of Health and Environmental Control
2600 Bull Street, Columbia, SC 29201

Commissioner: Douglas E. Bryant

Board: John H. Burriss, Chairman
William M. Hull, Jr., MD, Vice Chairman
Roger Leaks, Jr., Secretary
Richard E. Jabbour, DDS
Cyndi C. Mosteller
Brian K. Smith
Rodney L. Grandy

Promoting Health, Protecting the Environment

BUREAU OF DRINKING WATER PROTECTION

CONSTRUCTION PERMIT

Permission is Hereby Granted to: Commissioners of Public Works
Greenville Water System
Post Office Box 687

for the construction of a potable water source, treatment and/or distribution system in accordance with plans, specifications and design calculations dated May 1, 1996 b Gary R. Talmage, S.C. registration no.: 17374.

PROJECT NAME: Contract No. 84 - Table Rock and North Saluda Filtration Project.

COUNTY: Greenville

PROJECT DESCRIPTION: Construction of a 75 MGD dissolved air flotation water treatment plant and modifications to an existing pumping station.

Water Provided By: N/A System Number: 2310001

SPECIAL CONDITIONS: (See attached page.)

Permit Number: 111296 Date: June 27, 1996

EXPIRATION DATE: January 31,2000

This is a permit for construction only and does not constitute State Department of Health and Environmental Control approval, temporary or otherwise, to place this system in operation.

Joe L. Rucker, P.E.
Assistant Bureau Chief
Bureau of Drinking Water Protection

JSF Log No.: 961333

cc: Gary R Talmage, P. E., Black & Veatch
Doug Johns, P.E., Appalachia II EQC District Director
J. Mike Parrott, Appalachia II District Sanitary Director

recycled paper

SPECIAL CONDITIONS:

1) This construction permit is based on the Project Basis Report (PBR) signed and dated by Gary R. Talmage, P.E. on May 30, 1996. The PBR includes Level 2 Submittal drawings dated May 1, 1996, the Design Memorandum dated July 18, 1995, as amended May 7, 1996, and major equipment specifications. Any additions to and/or revisions of these documents which include items that are subject to the provisions of the **State Primary Drinking Water Regulations** shall be submitted to the Department for review and approval prior to construction. Two (2) complete sets of record drawings will be required upon completion of the project.

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL 961333

W-992-12

APPLICATION FOR PERMIT TO CONSTRUCT
PUBLIC WATER SUPPLY SYSTEM

NAME OF PROJECT: Contract No. 84 - Table Rock and North Saluda Filtration Project

COUNTY: Greenville TEST WELL: YES _____ NO X

IS THIS PROJECT A FOLLOW UP TO A TEST WELL PERMIT? YES ____ PERMIT # _____ NO X

In accordance with Section 44-55-10 et seq of the Code of Laws of South Carolina, 1976, as amended, I hereby make application, on behalf of the owner whose name appears below, for a permit to construct (describe): The proposed Work provides for the construction of a 75 million gallon per day dissolved air flotation water treatment plant and modifications to an existing pumping station.

OWNER'S NAME AND ADDRESS: Commissioners of Public Works, Greenville Water System,
P. O. Box 687, Greenville SC 29602 Phone No.(864) 241-6155

NAME AND ADDRESS OR ORGANIZATION RESPONSIBLE FOR OPERATION AND MAINTENANCE (if different from owner): N/A

RECEIVED
JUN 17 1996
Water Supply Permitting & Technical Assistance Division

NAME OF WATER SUPPLY SYSTEM PROVIDING WATER: Greenville Water System

DHEC SYSTEM NUMBER OF WATER SUPPLY SYSTEM PROVIDING WATER: 2310001

STANDARD CONSTRUCTION SPECIFICATIONS ON FILE AT DHEC: YES _____ NO X

Construction plans, material and construction specifications, including supporting design calculations, are herewith submitted and made a part of this application. I have placed my signature and seal on the engineering documents submitted, signifying that I accept responsibility for the design of this system.

TYPED: Gary R. Talmage SIGNED: Gary R. Talmage S. C. REG. NO. 17374
(Registered Professional Engineer)

ADDRESS: Black & Veatch, 8604 Cliff Cameron Drive, Suite 164, Charlotte NC 28269
Phone No.(704) 548-8461

Prior to final approval, I will submit a statement certifying that construction is complete and in accordance with approved plans and specifications, to the best of my knowledge, information, and belief. This certification will be based upon periodic observations of construction and a final inspection for design compliance by me or a representative of this office who is under my supervision.

TYPED: Gary R. Talmage SIGNED: Gary R. Talmage S. C. REG. NO. 17374
(Registered Professional Engineer)

ADDRESS: Black & Veatch, 8604 Cliff Cameron Drive, Suite 164, Charlotte NC 28269
Phone No.(704) 548-8461

I have read this application and agree to the requirements and conditions that are contained in it. Also, I agree to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

TYPED: Lyndon B. Stovall SIGNED: L B Stovall DATE: 6-13-96
(Owner) (Owner)

***** FOR INSTRUCTIONS ON FILLING OUT THIS FORM, PLEASE REFER TO THE BACK *****

DHEC 1936 (Rev. 8/88)

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL 961333

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NAME AND ADDRESS OR ORGANIZATION RESPONSIBLE FOR OPERATION AND MAINTENANCE (If different from owner): N/A

RECEIVED
JUN 17 1996
Water Supply Permitting & Technical Assistance Division

NAME OF WATER SUPPLY SYSTEM PROVIDING WATER: Greenville Water System

DHEC SYSTEM NUMBER OF WATER SUPPLY SYSTEM PROVIDING WATER: 2310001

STANDARD CONSTRUCTION SPECIFICATIONS ON FILE AT DHEC: YES _____ NO X

Construction plans, material and construction specifications, including supporting design calculations, are herewith submitted and made a part of this application. I have placed my signature and seal on the engineering documents submitted, signifying that I accept responsibility for the design of this system.

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(Registered Professional Engineer)

ADDRESS: Black & Veatch, 8604 Cliff Cameron Drive, Suite 164, Charlotte NC 28269
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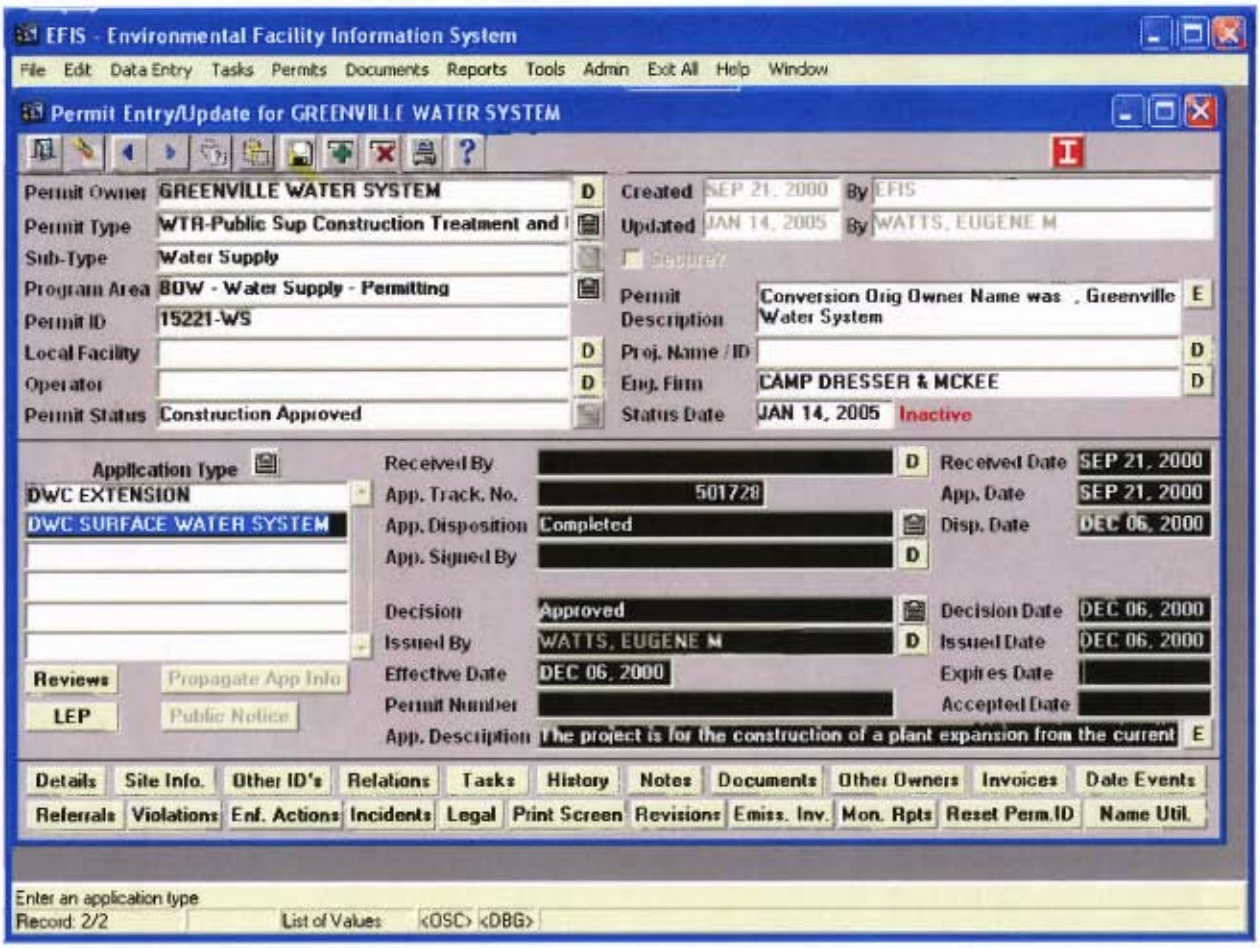
TYPED: Lyndon B. Stovall SIGNED: L B Stovall DATE: 6-13-96
(Owner) (Owner)

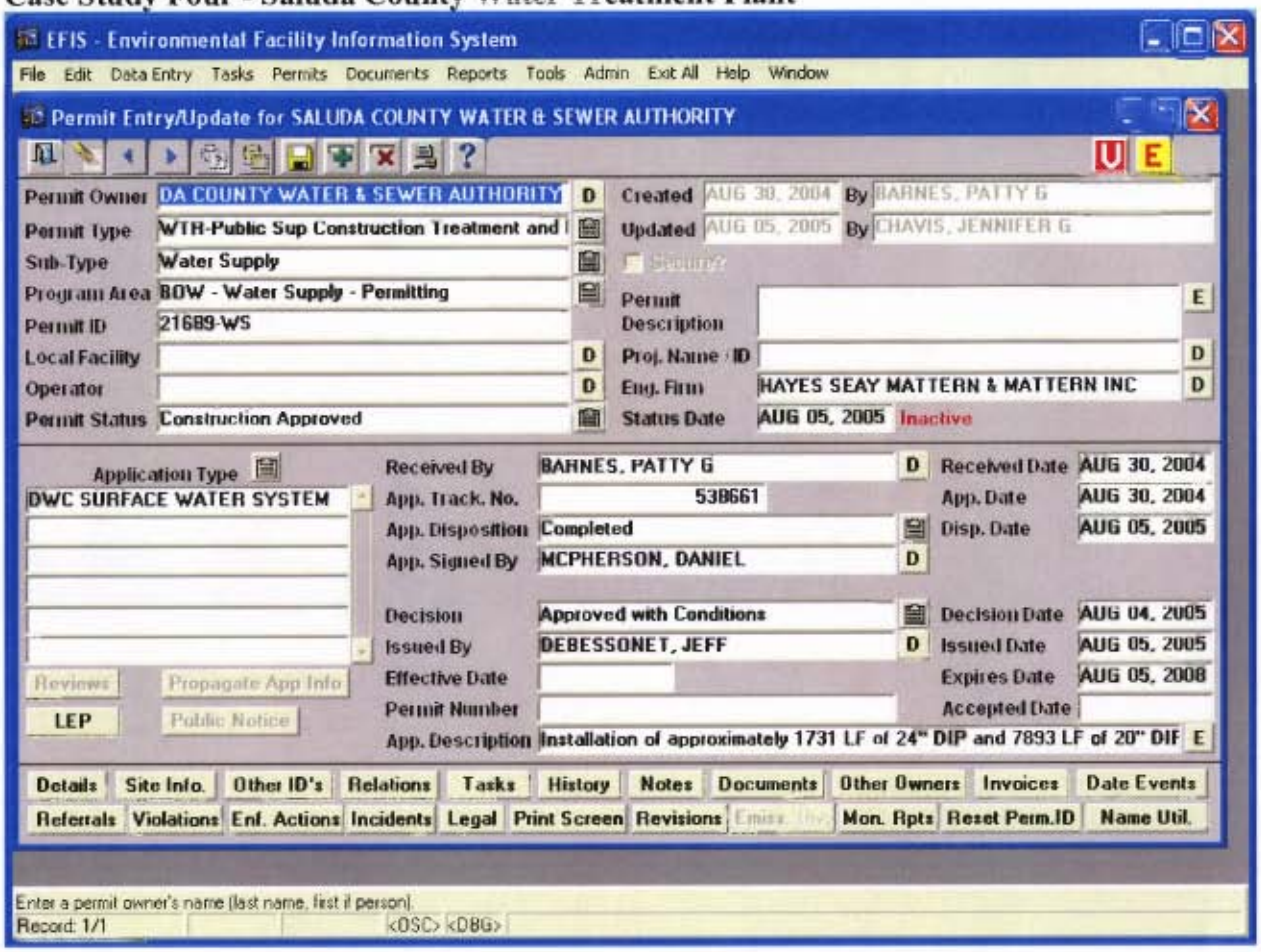
***** FOR INSTRUCTIONS ON FILLING OUT THIS FORM, PLEASE REFER TO THE BACK *****

DHEC 1936 (Rev. 8/88)

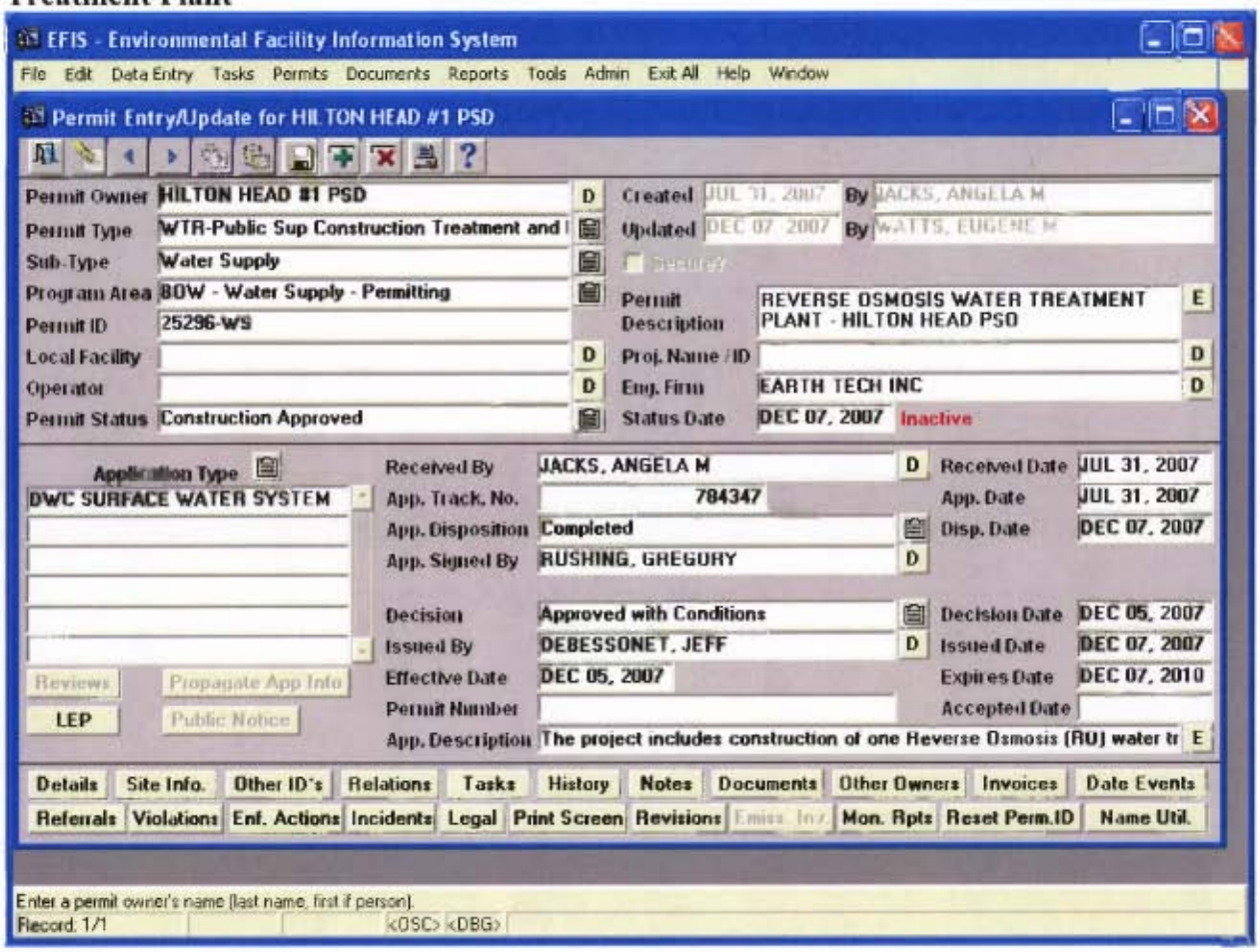
Case Study Two - Adkins Water Treatment Plant



Case Study Four - Saluda County Water Treatment Plant



Case Study Five - Hilton Head Public Service District #1 Reverse Osmosis Water Treatment Plant



Appendix 3 – Design-Build Survey

Stakeholders Response to DHEC Alternate Delivery Methods/Integrated Delivery Methods Questionnaire

1. *Biddable plans & specs are required for DHEC to issue a Permit to Construct. How do we issue this Permit without approved plans & specs?*

2. *How do other states issue a construction permit without a completely designed plans & specs submittal?*

3. *Our State regulations require a construction permit prior to performing any construction. Design/Build allows construction to begin before the plans & specs are completed. How can our State allow contractors to begin building prior to the issuance of a construction permit?*

4. *How do other states allow project sponsors to start construction without a construction permit?*

The Stakeholders believe that questions 1-4 have a common answer.

For design/build or other integrated delivery methods such as CM at risk, DHEC can issue a "conditional" permit based on a PER/DDR or other defined level of design. This would enable DHEC to enter the project into the SRF process for payment, and would allow the design-builder or Construction Manager at risk to receive payment as the process proceeds. If project schedule requirements necessitate beginning work prior to issuance of a final permit, the Owner and D/B must identify to the regulatory agency at the onset which portions of work need to proceed in phases prior to final project design completion. Once the regulatory agency approves the approach, the DB team must submit all documentation needed to obtain phased building permits and works to expedite design and other information required to obtain the proper permits to construct each phase. As design for each "segment/phase" of the project is completed and approved, a construction permit will be issued for that segment/phase (i.e. clearing, grading and erosion control permit; foundation and under-foundation MEP rough-in permit; structural permit; building permit; etc)

Attached is a flow chart of the Missouri process for permitting design/build projects

5. *Design/Build allows construction to start ahead of FNSI and permit approval. How does Design/Build deal with costly delays in construction resulting from resolving permitting or environmental issues? How does Design/Build save the project sponsor time and money when these delays occur?*

A project would not be started if there is any possibility of environmental delays. Environmental Impact's should be addressed well in advance of putting crews "on the ground". Regardless of the delivery methodology used, unknown site conditions should

be addressed by site investigations prior to project start or addressed in the contract document and/or in the Owner and design-builder contingencies.

6. *At what point in the SRF process does the project sponsor procure the Design/Build team? How do you "scope out" what is needed prior to having an engineer on board?*

It depends on what procurement method - Qualification Based Selection (QBS) or Best Value Selection - is used to appoint a Design/Build firm.

Several stakeholders noted that most Owners in their experience have hired a "procurement" or "bridging" consultant to define the project before selecting a DB team for a water or wastewater treatment plant. This definition can be very general (PER level) or some design level up to 30%.

If the procurement method is QBS, the owner selects the team based upon specified experience, resources and references needed for the project. Once selected, the design/builder will begin design and scope out the work. An engineering service fee is usually agreed upon for the full design prior to beginning work. To satisfy SRF requirements, the price of the project may then be worked up competitively through "open book" costing of equipment and subcontracts. Once the price is agreed with the owner, the contract is then delivered for the agreed lump sum or guaranteed maximum price. This price is usually agreed to between 60-80% of design.

If the procurement method is Best Value, the Owner first appoints an Owner's engineer to assist in defining the parameters of the project. This effort may include preliminary engineering - usually to a 10% to 30% design level. The Owner would then procure the design/builder using a two-step process. First Step would be to get DESIGNER-BUILDER teams to respond to a Request for Qualification (RFQ). Prequalification can be done in parallel with preliminary engineering. This allows the Owner to shortlist teams or companies that are qualified from an experience, safety, financial and quality perspective. The short-listed teams/firms would then respond to a Request for Proposal (RFP) prepared by the Owner and the Owner's Engineer. Selection is usually would be based on a combination of project approach and understanding, and a price factor – either total price of fees. In some States there have been fee-based price selection on engineering, project management, construction management, start-up and commissioning of a project being submitted, where the cost of the work will be built up in a similar manner as described above for QBS selection. These typically have been more commercial and industrial projects than wastewater treatment projects.

In other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk the contractor is generally selected on a qualification/fee basis early in the design process.

7. *If a project sponsor does not have in-house expertise with the Design/Build process, they may have to retain a Design/Build consultant to assist with preparing the project scope, RFP documents, etc. If this is the case, how does Design/Build save the project sponsor time and money?*

Owners are increasingly developing experience with the Design-Build delivery method. Many

Owners have developed "in-house" capability to prepare scope, RFP documents, etc. Other Owners may choose to use an Owners Engineer to assist with the documents (this process is often followed regardless of the procurement methodology). Design-build is an integrated project delivery approach that generally saves money due to shorter schedule, greater project coordination early in project development, replacing an adversarial relationship with a team focused participatory relationship, the ability to determine costs earlier and purchase material and equipment sooner and thus safeguard against commodity risk escalation, etc.

In other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk the Owner prepares the scope and RFP documents for the engineer selection. The contractor is then selected and joins the engineer at or before 30% design. By having contractor input early on, changes can be made immediately through constructability reviews. This avoids costly and timely changes made at design completion as happens with the traditional design-bid-build delivery method. This also reduces the potential for change orders.

8. *At what point in the SRF process does the project sponsor procure the contractor? How is the contractor selection process competitive? What is the selection process and how is it applied?*

When using design-build delivery methodology, the contractor is a part of the design-build team (usually as either the D-B prime or as a subcontractor to the D-B prime). If using construction manager at risk (CMAR), the engineer is selected first through a competitive Qualifications Based Selection (QBS) process. The CMAR/GC is then selected using a QBS or process before the design reaches 30%. Both the D-B and CMAR delivery methods utilize competitive selection processes (either qualifications only or a combination of qualifications and price).

For the procurement, regardless of the procurement process selected, by definition, it is carried out in accordance with state law. Thus, compliance with the competitive competition is based on qualifications, experience and other non-price evaluation factors. requirement of the procurement is achieved. If qualifications based procurement, the If a one or two step best value price based procurement, the competition is based on price and other non-price evaluation factors.

9. *Few construction firms would possess the necessary technical and business skills, financial capability, or experience to participate in Design/Build projects. Also, few firms would have the time or money to invest in preparing Design/Build proposals that may not yield a contract. How do you reverse the inherent tendency of Design/Build to limit competition?*

The technical, business and financial skills and experience a contractor needs to pursue any given project, regardless of the delivery approach, are determined by the size and complexity of the project. Contractors that would not pursue and large complex DB or other integrated delivery project, would most likely not pursue the project if it were a traditional DBB project. A project that matches the technical, business and financial capability and experience of a contractor will most likely be pursued by the contractor regardless of the delivery approach. There is no inherent reason that DB, or other integrated delivery projects, will reduce competition we believe.

10. *How does the contractor cost out a project yet to be fully designed? How can they give a Guaranteed Maximum Price (GMP)?*

The design/builder will cost out the work in the following manner:

QBS- Usually this allows the design to be taken to 60% before a price is agreed with the Owner. This allows the design/builder to define further the riskier parts of the project and take the design beyond 60% to safeguard itself against pricing risk. With this method of procurement, the design/builder generally has very few change orders as they are able to work with the Owner in a very collaborative manner throughout the project.

Best Value- The Owner needs to ensure that they have defined all their requirements in the RFP document, which would include preferred equipment suppliers, expectations of quality and the type of architectural finishes it requires, along with plant performance. This allows the design/builder to do some upfront design and costing, which it then puts forward as part of its proposal in response to the RFP.

With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk, the contractor will develop a GMP at the 60-90% design point.

11. *Are there change orders in a Design/Build process? If so, how does the change orders affect the GMP?*

Yes. They are basically handled just as in a design/bid/build project.
The design builder has the responsibility of providing a complete price for the project as described and intended. Additional items/scope required to produce the project as envisioned in the design documents are the responsibility of the design builder. If the owner desires the use of a more expensive component than that included by the design builder that meets the design intent, the additional cost could lead to a change order. Also, if the owner adds a component to the project that is not required for the design, there could be a change order. Whether or not the change order affects the GMP depends on the contractual terms, i.e. are there shared savings between the owner and the design builder, or is there a project contingency included in the GMP?
With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk change orders are handled in the same manner as a design/bid/build.

12. *How do you handle the bonding and insurance issues? At what point is the contractor required to produce performance & payment bonds and an insurance certificate? How do you assure that the project has adequate coverage?*

If work begins prior to design completion & GMP determined, how does the contractor know the amt of the bond required? Surety to be comfortable issuing bond w/o a finalized GMP? What is a complete set of plans? Not a complete issued for bid package to set up bond capacity?

With design/build or other alternate delivery method or integrated delivery method, the contractor is required to have sufficient bonding and insurance in place prior to doing any work on site. The owner can required the same insurance coverage contained in the normal insurance program – no different than any other project.

13. *How do you address the DBE requirements?*

DBE requirements are addressed as on any other project. The design build contractor is required to document efforts and results and meet any targets as in a conventional DBB project.
The DBE requirements need to be identified in the RFQ so that the design/builder can put together its DBE plan as part of its bid in response to the RFP.

14. *When the engineer and contractor are in a Design/Build partnership, there is no longer a system of "checks and balances" between the designer and the constructor. The project sponsor loses its ability to assure project quality, construction oversight and monitoring. How is this "loss" counteracted?*

On the contrary, with a QBS selection the project sponsor has greater control over the vendor selection and quality of material used to construct the plant. The project sponsor receives a competitive price open-book build up and can make equipment selection choices and quality choices of material through the build up of that cost.

If procurement is based on best value selection on a full lump sum price, then we would recommend the project sponsor appoint an Owner's Engineer to assist in the review of the price, approach and proposals of the design/build contractor.

With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk typically have an "open book" approach.

15. *In Design/Build, the engineer is no longer accountable to the project sponsor but rather to the "team". How can the project sponsor assure there is no pressure on the engineer by the team to reduce quality criteria or design standards to minimum levels in order to maximize profit?*

As with any project delivery method an Owner must make sure they have only qualified, reputable firms performing the work. An Owner is a much higher risk of a low quality work utilizing tradition Design-Bid-Build, than these other methods that allow greater scrutiny of the bidders.
As the engineer is still the engineer of record they do need to stamp the drawings and certify that the quality of the work they produce will meet the need of the project.

With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk, the Owner is more involved with qualifications and design standards than DESIGNER-BUILDER.

16. *In our State, we do not perform any type of inspection during construction. Normally, the consulting engineering firm provides inspection services. How is construction inspection independently monitored if the engineer is part of the team?*

This is done either by the owner's site representative or the Owner's Engineer.
With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk construction inspection may be performed by the owners site representative or the engineer of record.

17. *In our State, we require Monthly Construction Inspection Reports to be submitted to our office. Normally, the consulting engineering firm completes these reports. How can we accept the engineer's certification when he is part of the Design/Build team?*

This is done either by the project sponsors' site representative or its Owner's Engineer.

With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk this is conducted by the Owner or project engineer.

18. *In our state, the consulting engineer certifies that the construction is in compliance with the approved plans & specs in order for DHEC to issue an Approval to Place into Operation. If the engineer is part of the Design/Build team, how is quality control maintained?*

The engineer of record does NOT shed their accountability to the owner. However, some owners may choose to retain an Owner's Engineer throughout the design build process to give them an added level of comfort regarding the process.

With other Alternate Delivery Methods or Integrated Delivery Methods e.g., Construction Manager At Risk this is conducted by the Owner or project engineer.

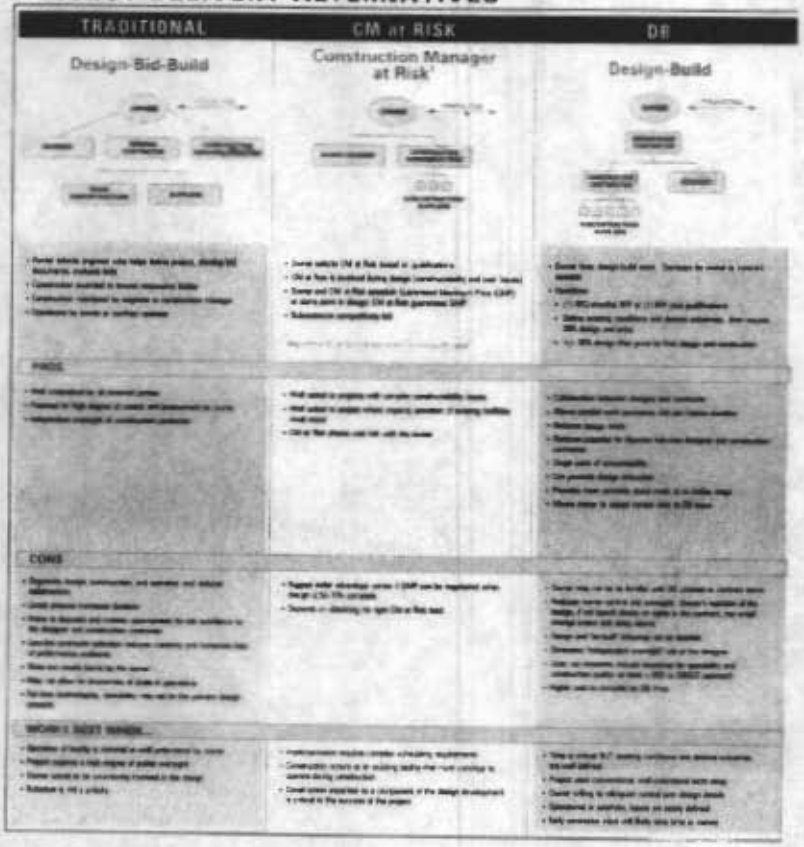
19. *How do other states handle the draw process? Who certifies the completed quantities and stored material on the pay requests are correct?*

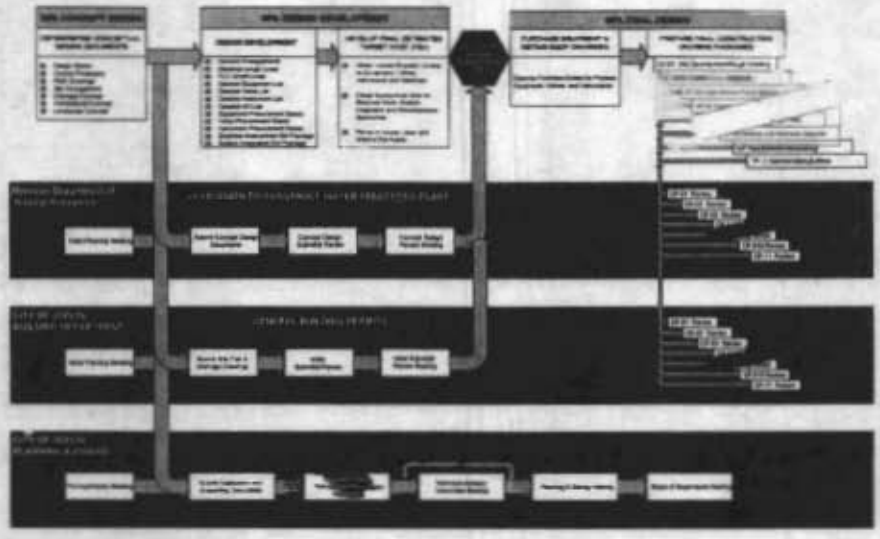
This is done either by the project sponsors' site representative or its Owner's Engineer

Stakeholders

Company/Agency	Name
Beaufort/Jackson W&S	Ed Saxon
Black & Veatch	Jeff Wells
Charleston Water System	Mark Cline
Crowder Construction	Mark Dickson
Design South	Joe Greenburg
Hazen and Sawyer	Ron Taylor
M B Kahn	Bill Edmonds
Mt. Pleasant Waterworks	David Niesse
Pizzagalli Construction	John Skadburg
Spartanburg Water	David DePratter

PROJECT DELIVERY ALTERNATIVES





Design/Build Issues

1. ***Biddable plans & specs are required for DHEC to issue a Permit to Construct. How do we issue this Permit without approved plans & specs?***

See answers to 2 and 3 below.

2. ***How do other states issue a construction permit without a completely designed plans & specs submittal?***

Other states regulatory agencies require complete information on the *process* but not "biddable plans and specs". Information required usually includes complete P&ID's, equipment lists, outline specifications and general arrangements. To facilitate the process, owners and DB contractors often offer to have scheduled update meetings with regulatory agencies to keep agency personnel informed as to intent and to avoid surprises.

3. ***Our State regulations require a construction permit prior to performing any construction. Design/Build allows construction to begin before the plans & specs are completed. How can our State allow contractors to begin building prior to the issuance of a construction permit?***

In states that allow DB, the owner or DB contractor (depending on contractual terms) often perform early construction "at risk". If structures that are begun need to be modified to conform to regulatory requirements, the modifications are done at the owner's or contractor's expense.

4. ***How do other states allow project sponsors to start construction without a construction permit?***

See the answer to 3 above.

5. ***Design/Build allows construction to start ahead of FNSI and permit approval. How does Design/Build deal with costly delays in construction resulting from resolving permitting or environmental issues? How does Design/Build save the project sponsor time and money when these delays occur?***

The process described in the answer to item 3 is intended to identify and resolve and issues that may cause "costly delays in construction" by eliminating permitting or environmental issues.

6. ***At what point in the SRF process does the project sponsor procure the Design/Build team? How do you "scope out" what is needed prior to having an engineer on board?***

[Butch – I don't know two much about the "SRF process" but this answer probably covers what they are after] In most cases the project sponsor will engage a design firm (the Owner's Engineer) to establish general project criteria

and technical requirements. The Owner's engineer usually then assists the Project Sponsor in selecting the DB contractor.

7. *If a project sponsor does not have in-house expertise with the Design/Build process, they may have to retain a Design/Build consultant to assist with preparing the project scope, RFP documents, etc. If this is the case, how does Design/Build save the project sponsor time and money?*

Savings results from the efficiency and creativity of a design build team. By have both designers and constructors working together throughout design development, the team has the maximum opportunity to jointly identify the most efficient/cost effective approach to execute a particular project scope. Project sponsors can realize maximum savings by establishing basic project/performance criteria and allowing the DB teams to select a design that meets the requirements.

8. *At what point in the SRF process does the project sponsor procure the contractor? How is the contractor selection process competitive? What is the selection process and how is it applied?*

Design build procurements are almost always two stage procurements. The first stage, prequalification, allows the project sponsor to short-list a number of design-build teams based on the qualifications and project history of the teams. This process is totally independent of the permitting process. After the teams are selected, the point of final selection of a DB contractor depends on the approach chosen by the project sponsor. If the sponsor desires a purely price-based selection, the Owner's engineer will normally prepare a design criteria package that includes 10 to 30% design, depending on the level of specific requirements the project sponsor wants incorporated in the design. If the project sponsor desires to select a design build team based on a combination of individuals proposed, project understanding and approach, and costs such as fees and mark-up, the design build team can be selected with only the PER or DCR completed. In either case, the design build team will be responsible preparing all materials required for obtaining permits.

9. *Few construction firms would possess the necessary technical and business skills, financial capability, or experience to participate in Design/Build projects. Also, few firms would have the time or money to invest in preparing Design/Build proposals that may not yield a contract. How do you reverse the inherent tendency of Design/Build to limit competition?*

10. *How does the contractor cost out a project yet to be fully designed? How can they give a Guaranteed Maximum Price (GMP)?*

One must assume that the only teams a project sponsor would prequalify for a DB project would be those with a very successful track record building the type of project envisioned. Contractors with this experience have extensive databases

of actual cost experience on which to draw. In addition, their estimators and project managers know what a completed facility looks like and are held responsible for pricing a completed project – NOT only what is on partial design documents.

11. *Are there change orders in a Design/Build process? If so, how does the change orders affect the GMP?*

The design builder has the responsibility of providing a complete price for the project as described and intended. Additional items/scope required to produce the project as envisioned in the design documents are the responsibility of the design builder. If the owner desires the use of a more expensive component than that included by the design builder that meets the design intent, the additional cost could lead to a CO. Also, if the owner adds a component to the project that is not required for the design, there could be a change order. Whether or not the CO affects the GMP depends on the contractual terms, i.e. are there shared savings between the owner and the design builder, or is there a project contingency included in the GMP?

12. *How do you handle the bonding and insurance issues? At what point is the contractor required to produce performance & payment bonds and an insurance certificate? How do you assure that the project has adequate coverage?*

The design build contractor is required to have sufficient bonding and insurance in place prior to doing any work on site. The owner can required the same insurance coverage contained in the normal insurance program – no different than any other project.

13. *How do you address the DBE requirements?*

DBE requirements are addressed as on any other project. The design build contractor is required to document efforts and results and meet any targets as in a conventional DBB project.

14. *When the engineer and contractor are in a Design/Build partnership, there is no longer a system of "checks and balances" between the designer and the constructor. The project sponsor loses its ability to assure project quality, construction oversight and monitoring. How is this "loss" counteracted?*

Design build practitioners do no agree that there is a "loss" of checks and balances. The engineer partner in a design build team retains the "engineer of record" responsibility to the owner. A major part of the selection process for design build teams is the prequalification process. This process using includes background checks and references. Any design-builder or contractor who compromised the designer's traditional role would be out of business very quickly.

15. *In Design/Build, the engineer is no longer accountable to the project sponsor but rather to the "team". How can the project sponsor assure there is no pressure on the engineer by the team to reduce quality criteria or design standards to minimum levels in order to maximize profit?*

As mentioned in the answer to #14 above, the engineer does NOT shed their accountability to the project sponsor. However, some project sponsors may choose to retain their Owner's Engineer throughout the design build process to give themselves an added level of comfort regarding the process.

16. *In our State, we do not perform any type of inspection during construction. Normally, the consulting engineering firm provides inspection services. How is construction inspection independently monitored if the engineer is part of the team?*

17. *In our State, we require Monthly Construction Inspection Reports to be submitted to our office. Normally, the consulting engineering firm completes these reports. How can we accept the engineer's certification when he is part of the Design/Build team?*

Please see the answers to questions 14, 15 and 16 above.

18. *In our state, the consulting engineer certifies that the construction is in compliance with the approved plans & specs in order for DHEC to issue an Approval to Place into Operation. If the engineer is part of the Design/Build team, how is quality control maintained?*

Please see the answers to questions 14, 15 and 16 above.

19. *How do other states handle the draw process? Who certifies the completed quantities and stored material on the pay requests are correct?*

The draw process would vary depending on the contractual terms. If the contract is a fixed price contract, a schedule of values will be agreed on prior to beginning work. If the contract is a GMP, a schedule of values backed up by the contractors actual cost reports, or the actual cost reports may be the basis of payment. Either a project sponsor's representative of the owner's engineer would provide verification that pay request are "correct" and fair.

Design Build Questions:

1. **Biddable plans & specs are required for DHEC to issue a Permit to Construct. How do we issue this permit without approved plans & specs?**

   Permits can and should be issued. The permits are typically conditional or interim permits to construct based on the design submitted for DHEC review. For example, complete design can be submitted for the site work and foundations. DHEC could issue a permit to construct to cover the site work and foundations. As the design is submitted, DHEC would issue additional permits to cover the approved aspects of the design.

   There are a couple of ways this could be done. The first option is the Owner negotiates the design-phase services up 60-90% complete and then negotiate a GMP with the design-builder. One of the requirements of the design-builder is to submit plans and specifications to DHEC for approval to construct. This would presumably be done after the GMP is agreed to and the risk of obtaining the Permit to Construct would fall to the design-builder. The second option is if the Owner requires a firm fixed price at the proposal stage, then the design-builder will have to accept the risk of obtaining the Permit to Construct and price it into his bid. In both instances, the Owner will need to have some clearly worded provisions in the contract regarding the Permit to Construct, who has the risk to obtain a permit, what happens if a permit is not obtained after making reasonable effort to get one, etc...

   In a design-build project delivery, the issue with DHEC is what will they require in the Permit application. As you know, in design-build the amount of detail on the drawings and in the specifications is less than what we would include if bidding the construction under applicable state law. The design-build community and the owners will want to know what the criteria will be for obtaining a Permit to Construct.

   During our meeting we discussed issuance of conditional permits to allow construction start. A conditional permit could be issued with the DDR. Then, "final" or "change" permits would be issued as each project task design is competed. The main issue we discussed was, "will these conditional permits allow the Design-Builder entry into the SRF *system* for payment". Janice thought it was workable.

Response from a West Coast city:

You need to find out the level of detail required from the permitting agency and use that as the minimum requirements for permit submittal. If a DB contractor has submitted something incomplete they should be directed to satisfy the agency.

Washington State response:

In Washington, the State (Ecology) is obligated to approve an Engineering Report. We are submitting that document, which we are calling our Primary Design Document (PDD). Once Ecology has approved the PDD, Spokane County will sign a Delagation of Authority Agreement under which we perform many of the normal approval duties of the State. If the DBO chooses to deviate from the PDD in their proposal and bid, it is incumbent upon them to seek and obtain approval from Ecology for all deviations from the DBB.

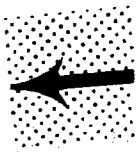
Other response:

We met with the local DEP, explained the need for D/B and worked out the necessary items they required for reviewed. Items like electrical are not needed or reviewed. They admitted a good design report is actually more helpful than 100% drawings.

2. **How do other states issue a construction permit without a completely designed plans & specs submittal?**

   Other states have issued permits but made them provisional or conditional based on the amount of design submitted.

   In Florida, we can get a DEP permit based on 30% documents (design report and drawings). This option was recently added – not sure the history of this decision, may be worthwhile to research this.



I only have experience with this in MA where the SRF was used on a design-build project. On that project, a $48 M CSO sewer separation program, the project was implemented in essence as I described above in the first option. I am not aware of other states that authorize the use of SRF funds for design-build even though there is nothing in the Federal SRF program that prohibits the use of design-build on an SRF funded project.

3. **Our State regulations require a construction permit prior to performing any construction. Design/Build allows construction to begin before then plans & specs are completed. How can our State allow contractors to begin building prior to the issuance of a construction permit?**

The Design/Build approach should not represent something that is so foreign that all prior regulatory policy and experience be put into question. The construction permit issue is a prime example. DHEC should and must require a permit to construct. The policy is a sound one and should not be backed away from. The type of permit issued and the process needs to be revised to accommodate the design build approach. As mentioned previously in this document, DHEC can issue the permit in phases and permit construction for the design portions that have been submitted. In this manner DHEC will have issued a permit, albeit numerous permits, for the construction based on a completed design that was submitted in logical pieces for sequencing construction.

This question is a little over-simplified. On projects with a particularly tight schedule - which is a driver to use design-build delivery - "construction activity" prior to completion of plans and specs is typically limited to site clearing and prep with some civil work. If the work is more involved than this, a separate construction package is sometimes developed to clearly delineate the scope of work for this "early construction activity."

I suggest that the State consider some uniform permit for early construction activity that could occur prior to their approval of the project plans and specs. The State would define the type and extent of construction activity that would be allowed under this permit and by having a uniform permit, all owners and design-builders would be treated the same.

Look at taking a similar approach to private/industrial plant approval (permit approval with very little detailed design). DHEC will receive a DDR from the design-build team prior to beginning any construction. Upon approval, the design progresses in phases based on the DDR. Permit these phases and construction can commence with a permit.

4. **How do other States allow project sponsors to start construction without a construction permit?**

   Other states have not allowed this. Construction permits have been issued for design build projects. How they did it is stated above.

   Plans and specs are developed in packages as needed for the contractor to get started with construction. These packages can be permitted separately in a staggered approach.

   My recollection from my involvement on the project in MA is that there was no early construction activity beyond site mobilization and material acquisition.

   Can't do it. See responses to "Question #3".

5. **Design/Build allows construction to start ahead of a FNSI and permit approval. How does Design/Build deal with costly delays in construction resulting from resolving permitting or environmental issues? How does Design/Build save the project sponsor time and money when these delays occur?**

   Design/Build construction should not be initiated ahead of a FNSI. FNSI and associated permitting need to be completed before any construction is initiated regardless of the project delivery approach utilized. Any project delivery approach should be structured so as to avoid costly delays in construction. The only time construction should be considered to be initiated before a FNSI and permit is the narrow situation where the construction is such that that the portion of the construction would not be impacted by FNSI results and the early initiation is within the overall project schedule taking into account the time needed for FNSI and permit completion. You do not want to get so far out in front where demobilization of construction force is then required.

   The Designer meets with the agencies early in the design process to review the concepts and receive feedback with the intent to avoid any construction delays due to noncompliance.

The issue of government approvals and delay damages is addressed in every design-build contract. Owners negotiate terms and conditions for these provisions that balance their risks and costs. When government approvals delay projects, there is not a lot that a design-builder can do to save the owner time and money. Environmental issues are a little bit different and they are addressed in every design-build contract under "differing site conditions" or similar contract clause.

We do not want to start the project if there is any possibility of environmental delays. Environmental Impact's should be addressed well in advance of putting crews "on the ground". Unknown site conditions are addressed by site investigations prior to project start or are addressed in the contract document and/or in the Owner and design-builder contingencies.

6. **At what point in the SRF process does the project sponsor procure the Design/ Build team? How do you "scope out" what is needed prior to having an engineer on board?**

Our recommendation is that the owner procure an integrated design-builder on a qualifications basis and work with the design-builder to develop the design-phase services scope of work.

Selection can be made early in the SRF process. In some circumstances the Owner can hire a design-build manager/program manager to create "bridging documents" for a particular process; however, we recommend the Owner allow the design-build teams to exercise a high level of "creativity" to recommend a process they feel will best meet the Owners needs.

7. **If a project sponsor does not have in-house expertise with the Design/Build process, they may have to retain a Design/Build consultant to assist with preparing the project scope, RFP documents, etc. If this is the case, how does Design/Build save the project sponsor time and money?**

Whether a project sponsor has the in house expertise or has to engage a consultant, the time to prepare for and implement the selected procurement strategy is the same amount of time. Design/Build time and cost savings are inclusive of the procurement time and expense. The cost and time of the

procurement is dependent on the approach selected. The procurement approach can range from a qualifications based procurement which is the most cost and time efficient to the two step best value price based procurement which is at the other end of the procurement spectrum. If the most time and cost extensive approach is selected it will have the greatest impact to overall cost and time savings. There have been examples of very costly and lengthy procurements and they are the exceptions rather the norm. In those cases, the owner and/or advisor were very cognizant of time and cost associated with the procurement method and schedule selected. By and large, a project sponsor has to carefully choose and manage the consultants selected, as most consultants tend to extend procurements and thee resultant cost increases.

Even with what would appear to be a lengthy and costly procurement, evidence shows that all or most of the project sponsors were satisfied with the benefits achieved with using the Design/Build project delivery approach. RW Beck in a recent survey on alternative project delivery reported that 96% of all those utilities that used Design/Build on a past project said they would use it again.

The amount of design that will be incorporated into the procurement approach selected is the biggest factor as to impacting cost and time. The amount of procurement requirements is another factor impacting the cost and time to review and evaluate proposals. Many project sponsors and the advisors ask for excessive amounts of information. Only the information needed for the selection should be asked for.

In a traditional design bid build approach there is a cost and time associated with the construction procurement which has to be added to the time and cost associated with the procurement of the engineer.

The design-builder has care and control of the process. The design-builder meets with the client to discuss and establish scope, review and agree to the design and produced the contract documents. This can be accomplished utilizing a interim review process by which the design-builder produces the standard 30% drawings and specs and if the client is satisfied with the produce, the design-builder moves to the 60% stage. At the 60% stage the client and design-builder agree on drawings and specs and the design-builder moves towards 90%/final design; at this interim step (60%) we have done projects by which we establish a lump sum

price for the design-build at the 60% stage. This saves considerable time and can be accomplished as long as the original RFP/agreement contains the proper set at 60%. As stated elsewhere herein, some states allow acquisition of certain permits based on 30% design documents.

The cost for an "owner's representative" is typically 2-5% of the total project cost depending on the scope of services for the owner's representative.
The owner will save time and money by allowing the design-builder to be innovative and not prescribe a specific design.

On average, the cost for these oversite services is 1% - 4% of the total project cost. The national average savings for design-build projects is around 13% - 16% (have seen some as high as 30 + %). The potential savings for D-B far outweigh the cost for a consultant.

DBIA Response:

Response from a West Coast city

There is a cost benefit with the support service consultants. It doesn't negate all of the savings (the savings for large construction projects outweighs the costs of consultants). As an example you might have 1-2 million consultant costs on a 100 million dollar project, but the construction savings can be 15-40 million. Some utilities are using more in-house expertise these days but that has a cost also.

Washington State response:

It is my personal opinion that extraordinary costs are incurred by a municipal agency in preparation of procurement documents and in the selection process for a DBO, but we still anticipate a savings on the overall cost of the project compared to a traditional Design Bid Build project. We have hired an engineering firm and a legal firm to assist in preparation of the procurement documents and the service agreement. This is the first DBO project for Spokane County. Ask me again in a year, if we achieved a true savings.

Other response:

Sometimes savings are a "wash" depending on the size and complexity of the project and if it is the first time for the owner and/or consultant. It may still be beneficial given other benefits like no legal claims which can equate to money saved, etc.

8. **At what point in the SRF process does the project sponsor procure the contractor? How is the contractor selection process competitive? What is the selection process and how is it applied?**

Contractors are selected through a competitive process whether as part of the procurement or during the actual build portion of a Design/Build project.

For the procurement, regardless of the procurement process selected, by definition, it is carried out in accordance with state law. Thus, compliance with the competitive requirement of the procurement is achieved. If qualifications based procurement, the competition is based on qualifications, experience and other non-price evaluation factors. If a one or two step best value price based procurement, the competition is based on price and other non-price evaluation factors.

After contract execution and prior to the initiation of construction, any of the work that will not be performed by the contractor(s) as part of the selected Design/Build "team", there will be additional competition. The "team" contractors will competitively bid the rest of the construction work in accordance with the completed design.

An integrated design-builder is both an engineer and a contractor. The definition of design-build presumes that both disciplines are within one entity or team. The contractor is part of the team at the project start.

When using design-build delivery, the contractor is a part of the team (usually as either the D-B prime or as a subcontractor to the D-B prime). If using construction manager at risk (CMAR), the engineer is selected first through a competitive Qualifications Based Selection (QBS) process. The CMAR/GC is

selected using a QBS process before the design reaches 30%. Both the D-B and CMAR delivery methods utilize competitive selection processes (either qualifications only or a combination of qualifications and price).

9. **Few construction firms would possess the necessary technical and business skills, financial capability or experience to participate in Design/Build projects. Also, few firms would have the time or money to invest in preparing Design/Build proposals that may not yield a contract. How do you reverse the inherent tendency of Design/Build to limit competition?**

   Experience to date has indicated that competition for design build is robust and project sponsors have had adequate proposers to undertake successful procurements and achieve project delivery success.

   In today's market, Design/Build is being used more and more by project sponsors. As the Design/Build market grows in a geographic region and there is a greater supply of Design/Build projects, that demand creates the supply of design builders. Firms adapt and begin to provide integrated design and construction services in house or team with other firms in varying business arrangements. For example, many contractors and engineering firms have teamed together to pursue design build opportunities. A Design/Build project fits the business profile of an engineering firm and a contractor. The Design/Build runs to their core competencies- design and construction. The projects are usually short term in nature (1 to 3 years) and the risks are the risks that these firms understand and are comfortable with. Throughout the country, the national engineering firms and contractors as well as the regional firms routinely pursue Design/Build opportunities. The levels of competition for these projects are most often robust with an appropriate number of qualified firms or teams comprising the competition.

   The owner's should have a right to decide the best project delivery system for them. Design-build transfers risk from owner (who bears all risk under the traditional design-bid-build delivery) to the design-builder. In the low-bid construction model, the owner has no assurance of quality since there is no qualification or quality criteria associated with their bid selection. Owners have their engineers do reference checks of the apparent low bidder but even with bad reference checks, it is very hard for the owner to reject the low bid.

The State does not understand the construction market, design-build would not limit competition.

Competition is limited to those companies that are qualified to do the work. The Qualifications Based Selection process is intended to allow the Owner to choose the most qualified "team" to design and construct his project. We have not seen a shortage of qualified design-builders willing to pursue these projects.

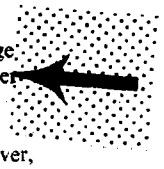
10. **How does the contractor cost out a project yet to be fully designed? How can they give a Guaranteed Maximum Price (GMP)?**

Contractors can price out a project without full design. The more of the design complete, the less of a contingency will be included in the price. In qualification based procurements, there have been Design/Build projects where lump sum prices have been given at 60% design complete. Prices have been given to project sponsors at varying design complete levels from 60% up to 100%.

With price based Design/Build projects, contractors have been successful with providing guaranteed costs. The Design/Build team works in a collaborative manner during the proposal preparation period and decides how much design is needed over and above what was provided by the project sponsor in the procurement documents. Depending on the structure or process, little additional design is needed or significant additional design is needed. As the competition is price based, proposers have to have "sharp pencils" as excessive amounts of contingency will lessen their competitiveness.

Evidence to date has shown that contractors are willing to guarantee prices with less than 100% design complete in Design/Build procurements.

The State does not understand the business we are in. Even on complicated treatment plant projects, we develop sufficient design detail at the 60-90% stage to develop GMP with contractor- and owner-controlled contingency. The closer to 100% design completion, the smaller the contractor contingency.



A good conceptual estimator can develop an "accurate" cost at 30-40%. However, the cost will be tweaked as the design progresses (risk allocated – contingencies adjusted) and a GMP negotiated at 75% - 90% design.

11. Are there change orders in design/build process? If so, how do the change orders affect the GMP?

Yes there are change orders. However, because design and construction accountability and responsibility falls to the design builder (the single entity that executes the contract with project sponsor), the number of change orders are greatly reduced. There have been examples of Design/Build projects with no change orders.

Change orders are limited to only those initiated by the project sponsor or as a result of an uncontrollable circumstance.

The amount of the change order is simply added to the GMP or lump sum cost as an adjustment to the GMP or lump sum in strict accordance with the terms and conditions governing change orders.

There are no change orders based on missing or incorrect information (E&O) on the drawings and specs. Change orders are only generated based on Owner requests outside the contract.

Change orders are typically needed for additions/deletions of scope, events that trigger force majeure and differing site conditions which results in a change to the scope of work

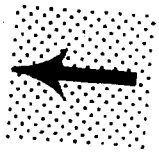
D-B change orders are generally owner generated for scope changes (deletions or additions). Early interaction between team members (Owner, engineer, contractor, regulators, equip. mfg., subcontractors) greatly reduce potential change orders and litigation for both CMAR and D-B. Depending on the reason for the change, the GMP should not be effected. Open pricing allows a tremendous amount of scope flexibility in both the CMAR and D-B delivery processes. Even with owner generated changes, the scope can be modified and the GMP will not be effected.

12. How do you handle the bonding and insurance issues? At what point is the contractor required to produce performance and payment bonds and an insurance certificate? How do you assure that the project has adequate coverage?

There has not been any bonding or insurance issues to date in the Design/Build marketplace. There have been some procurements where a project sponsor has taken an unreasonable and overly aggressive risk allocation posture. In those cases, the surety industry has interceded and described to the project sponsor the proper risk allocation for the surety to issue the bonds.

By and large, the performance and payment bonds and insurance requirements are the same as those for any construction project. The Design/Build requirements follow the construction industry standards.

In a qualifications based procurement, the bonds and insurance for the construction are provided prior to the initiation of construction. Part of the selection process was proof that the proposer and the team possess the financial wherewithal including ability to secure the required bonding and insurance.



In a best value price based procurement, the bonds and insurance are provided at contract signing, after a certain number of days after contract signing (usually 30to 60days) or prior to the initiation of construction.
Applicable state law would have to be complied with and such Sate law may dictate the timing to the bonds and insurance.

!00% of the construction value performance and payment bonds are the industry norm and have been adequate. As for insurance, the project particulars would dictate the exact requirements, but insurance tends to be the same industry standard as applies for the construction industry.

As part of the insurance for the design/Build would also be the industry standard insurance coverages for a design engineer.

The cost of the payment/performance bonds and insurance are included in the GMP, typically at a rate of approximately 1.5% of total project cost. Any unused portion of the budget created by an overrun is posted to project allowances for the Owner's use. Overruns of budget are funded by previously established Owner's allowances.

Bonds are posted prior to construction. Proof of ability to get a bond can be secured at the proposal stage prior to selection of design-builder.

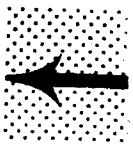
Bonding and insurance are handled the same as with D-B-B.

13. How do you address the DBE requirements?

The project sponsor includes any DBE requirements into the procurement whether required by law or project sponsor policy. The process is the same as with any design or construction contract with a traditional design bid build project delivery approach.

Design builders to date have readily accepted such requirements and have been able to comply with such requirements. For example, the City of Houston in a major design/build/operate water treatment plant and conveyance project was able to achieve the following results: Design goal 24%-actual 46%; construction goal 19%-actual 25%; $23.4 million to 58 MWBE firms.

Define the intent and requirements. In Augusta Parsons established a project goal of 35% L/M/WBE participation for a $63.5M project. The project plan provided that there was a commitment to L/M/WBE entities of 38%. This is tracking to date. It is important to note that gender-based or race-based selections are against the law and cannot be utilized in the evaluation and selection process; each entity must compete on an equitable basis. That is the law, while reality of certain political environments may covertly prove otherwise.



Not a problem. Design-builders address this all the time on projects. Owners need to specify requirements up-front.

The Owner presents DBE requirements in the RFP (same as D-B-B).

14. When the engineer and contractor are in a Design/Build partnership, there is no longer a system of "checks and balances" between the designer and the contractor. The project sponsor loses its ability to assure project quality, construction oversight and monitoring. How is this"loss" counteracted?

There still exist checks and balances as the engineer is still subject to the code of conduct and ethics of the engineering profession, has to stamp and seal project design and otherwise comply with applicable law as it

relates to the design. A project sponsor often retains the services of its engineer (unless that engineer has joined a Design/Build team) or can engage an engineer to provide whatever level of "check and balances" the project sponsor deems appropriate.

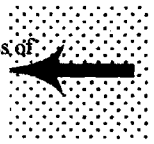
The project sponsor does not lose its ability to assure quality or construction oversight or monitoring. As for project quality, the project sponsor specifies the project quality that is important to it and leaves the rest to the discretion of the proposer. Such project quality requirements can vary from project to project and is dependent on the project sponsor. The project sponsor also has the ability to question and seek additional information prior to selection or during negotiations as to project quality. Lastly, the project sponsor can at any time make a project quality decision after contract execution.

In a best value price based selection, any project quality change made by the project sponsor prior to selection or contract execution is usually made as a price adjustment by propose. After contract execution, it would be handled via a change order. There would be no price adjustment for any quality requirement that was specified in the procurement and the proposer failed to provide.

As for construction oversight and monitoring, it is typical for any Design/Build project that a project sponsor engages an engineer to provide the needed oversight and monitoring. The scope of services for this work is greatly diminished from the typical services provided by an engineer during construction in a traditional design bid build. Those services are part of the Design/Build cost and the responsibility of the design builder. The costs for these oversight and monitoring services is additional but nominal when compared to the overall cost of the project.

The Owner should retain a consultant to function as an Owner's rep.

We strongly disagree with the whole premise of this question. There is no loss of quality, checks and balances, no loss of owner control. We would need to sit down with the State and talk this through with them



With any alternate project delivery method, the Owner actually has greater control of the project. Companies that participate in APD are resume protectors and understand that the best opportunity for repeat business is by meeting or exceeding Owner's expectations. Therefore, we must manage the budget, schedule, quality, safety, etc. to ensure that we are rewarded for our performance on the next project. With QBS – if you don't perform, you don't work!

The owner can retain an engineer rep to assist with overseeing the work.

DBIA Response: Response from a west coast city

We use an Owner monitoring program for construction QA/QC. Special building inspection is done with certified people and laboratories, and they are on direct contract with the DB contractor.

Washington State response:

Spokane County will retain an engineering firm during design and construction to act as our representative, including onsite observations of the construction.

15. In Design/Build, the engineer is no longer accountable to the project sponsor but rather to the"team". How can the project sponsor assure there is no pressure on the engineer by the team to reduce quality criteria or design standards to minimum levels in order to maximize profit?

The engineer is still subject to the code of conduct and ethics of the engineering profession, has to stamp and seal project design and otherwise comply with applicable law as it relates to the design.

Quality criteria requirements are reviewed by project sponsor during the proposal evaluation to ensure that the proposals are based on such requirements. If there are shortfalls, project sponsors can request that proposals be modified to comply with all requirements or it can accept such shortfalls, if the project sponsor decides that there are other reasons to do so, most notably cost savings.

Design standard requirements are reviewed by project sponsor during the proposal evaluation to ensure that the proposals are based on such requirements. If there are shortfalls, project sponsors can request that proposals be modified to comply with all requirements or it can accept such shortfalls, if the project sponsor decides that there are other reasons to do so, most notably cost savings.

Reducing design standards comes with a very high cost. Any reputable engineer would not agree to such a thing or if it did it would do so only with the contractor or party making such a request assumes the full liability for non-performance. In a Design/Build a single entity is responsible for all design and construction and guarantees cost, schedule and performance. Assuming such performance liability is extremely risky under the circumstances. If the project does not perform the des9ign builder is liable to make it perform and cannot point fingers at an engineer, or supplier or contractor as the design builder was accountable to the project sponsor for the entire design and construction.

The Owner is part of the "team." The Engineer designs to the extent of the contract requirements and the standard of care.

We strongly disagree with the whole premise of this question.

The Owner. engineer and contractor are part of the "team". The Owner takes part in decisions that effect design. Any concerns are addressed at that time. With open book pricing, the Owner is aware of the "profit/fee".

16. **In our State, we do not perform any type of inspection during construction. Normally, the consulting engineering firm provides inspection services. How can construction inspection be independently monitored if the engineer is part of the team?**

Project inspection services are part of the scope of the Design/Build project. Typically, there are oversight and monitoring inspection services provided by the engineer engaged by the project sponsor.

Alternatively, the project sponsor could remove the inspection services from the design builder' scope of work and engage and pay for such services.

See answer for #14.

In design-build, the performance requirements and risk are on the design-builder. The owner can require that the design-builder produce daily logs and documentation to show what has been constructed like a typical resident engineer does. It is the owner's choice if he/she wants to have onsite inspection and most owners do have some field oversight but not as detailed as the scope of work for a typical resident engineer on traditional project delivery.

The Owner could opt to provide these services.

DBIA Response: We had a full time inspector from our staff or hired as a contract employee.

17. **In our State, we require Monthly Construction Inspection reports to be submitted to our office. Normally, the consulting engineering firm completes these reports. How can we accept the engineering firm's certification when he is part of the Design Build Team?**

The engineer is still subject to the code of conduct and ethics of the engineering profession and otherwise complies with applicable law as it relates to the construction inspection services. The engineer's certification could be such that a licensed PE has to sign and seal each report.

The project sponsor's oversight and monitoring engineer would be reviewing such reports for compliance.

See answer for #14.

We would prepare these reports for the owner and submit to the State.

18. **In our State, the consulting engineer certifies that the construction is in compliance with the approved plans & specs in order for DHEC to issue an Approval to Place into Operation. If the engineer is part of the Design/Build team, how is quality control maintained?**

As part of the Design/Build proposal will be the proposers narrative of its QA/QC plan. The contract will require that QA/QC plans for design and construction be developed and submitted to the project sponsor for review. These plans will be in accordance with any contractual requirements (usually the requirements from the procurement documents are incorporated into the contract) as well as industry standards and applicable law.

See answer for #14.

Engineers have a duty and responsibility to the public they serve - it is a requirement of maintaining one's license to practice engineering in the State. We as the design-builder are also meeting a performance specification that the facility meet the State's Operation requirements.

19. How do other states handle the draw process? Who certifies the completed quantities and stored material on the pay requests are correct?

Not a problem. The design-builder would be responsible for providing this documentation to the owner and submitting to the State if requested by the owner.

Design/Build Issues

1. *Biddable plans & specs are required for DHEC to issue a Permit to Construct. How do we issue this Permit without approved plans & specs?*

Each municipality within the state of South Carolina has their own breakdown of the permitting process, but most, if not all jurisdictions within our state allow permits to be segmented to allow work to commence prior to completion of the final permitting documents. When fast tracking a project in this manner it is important to sequence the design, permitting and pricing process with the work sequence. Generally permits can be obtained in the following fashion.

Clearing, Grading and Erosion Control Permit
Foundation and Under-foundation MEP Rough-in Permit
Structural Permit
Building Permit

2. *How do other states issue a construction permit without a completely designed plans & specs submittal?*

No jurisdiction within our State will issue a Building Permit, full or partial, without proper submission of documents. The building team must submit all required documentation needed for the permit they are pulling, be it a partial permit, and/or full building permit.

3. *Our State regulations require a construction permit prior to performing any construction. Design/Build allows construction to begin before the plans & specs are completed. How can our State allow contractors to begin building prior to the issuance of a construction permit?*

Even in design build the builder must submit all documentation needed to obtain a building permit. If a project's needs are to begin work prior to issuance of a final permit, the Owner and Design/Builder must identify at the onset which portions of work are to proceed without final project design. The team then works to expedite design, costs and obtain the proper approvals (permits) for that portion of work while the remaining work of the project is finalized.

4. *How do other states allow project sponsors to start construction without a construction permit?*

We can't speak to other states as they relate to the treatment plant business, but other municipalities and public agencies in South Carolina are utilizing alternative delivery methods, but no jurisdiction within our state will issue a Building Permit, full or partial, without proper submission of documents. To begin construction prior to final design the project team must endeavor to sequence the design, permitting and pricing process with the work sequence for those critical portions of work that must start early.

5. *Design/Build allows construction to start ahead of FNSI and permit approval. How does Design/Build deal with costly delays in construction resulting from resolving permitting or environmental issues? How does Design/Build save the project sponsor time and money when these delays occur?*

The design/builder is responsible for gaining knowledge of and familiarizing themselves with the permit and approval requirements. They then base their entire sequence and start of work upon this information. Since the Design Builder is responsible for the obtaining the proper permits, they will usually take the risk associates with delays to this process.

6. *At what point in the SRF process does the project sponsor procure the Design/Build team? How do you "scope out" what is needed prior to having an engineer on board?*

Whether it is Design/Build, CM at Risk or another project delivery method, the earlier in a project the entire team is selected, the better the result. However, no matter which delivery method is chosen, it is in an Owner's best interest to be as clear as possible about the services they are procuring and what their final expectations are. For instance, Western Carolina recently prepared a Preliminary Engineering Report for their Piedmont Wastewater Treatment Plant. This would be an excellent document (is probably slightly more than needed) to issue with a RFP. This document would suffice whether the goal is to award to a design builder, a separate designer and contractor, or separate designer and construction manager for collaboration at the onset. Their preliminary report contains a sufficient amount of information about the project for the competitors to clearly understand the Scope of Work. The only other information required in the RFP would be the Owner's required delivery method, schedule, and the basis of selection of the competitors.

7. *If a project sponsor does not have in-house expertise with the Design/Build process, they may have to retain a Design/Build consultant to assist with preparing the project scope, RFP documents, etc. If this is the case, how does Design/Build save the project sponsor time and money?*

\In most all instances the Alternative Delivery methods we are speaking of will substantially reduce the time frame from release of design to plant start-up and commissioning. For contractors and design engineers time relates to cost, and it is in the entire project team's best interest that once they are released to proceed that all is done to quickly complete a project. When a designer and contractor are allowed to collaborate at the onset, they are able to resolve the vast majority of obstacles that slow down the traditional design-bid-build well ahead of encountering them after construction begins.

We believe that once the Owners of plants become more familiar with the process, and experience that certain projects benefit from using alternative delivery methods, they will obtain the in-house expertise to manage this type of work.

8. *At what point in the SRF process does the project sponsor procure the contractor? How is the contractor selection process competitive? What is the selection process and how is it applied?*

Whether it is Design/Build, CM at Risk or another project delivery method, the earlier in a project the entire team is selected, the better the result. In order for the selection process to remain fair and competitive the selection criteria must be very clear to all competitors. There are many ways to insure that these processes remain competitive. As one example we attached copy of an RFP used by the City of Augusta for their municipal office building. In this process they desired to select a contractor at the beginning of the design phase. Among other criteria, the RFP required the contractors to propose the cost of their Fee and General Conditions to provide the services described in their RFP. (Please not how important it is that the project schedule be included in the RFP so that the contractors could respond properly) With this requirement, part of the Owner's final selection decision will be based upon the cost of services of the contractor, with the cost of the work being finalized once design is sufficient for pricing. Often times a contract utilizing this method includes language that if an Owner elects not to proceed after the final cost of the work is determined, they have the right to terminate the contract and pay the contractor for preconstruction services only at a predetermined rate.

9. *Few construction firms would possess the necessary technical and business skills, financial capability, or experience to participate in Design/Build projects. Also, few firms would have the time or money to invest in preparing Design/Build proposals that may not yield a contract. How do you reverse the inherent tendency of Design/Build to limit competition?*

It is important to note that design/build is not the right process for every project just like not all contractors are suited to build every project. It is in everyone's interest that the designer and contractor be well qualified to perform the work for which they are contracted. The market will adjust to whatever the rules for obtaining the project are however, it is very important that these rules not be written to exclude firms that are well experienced and qualified to perform the work. There are also other alternative methods such as noted above that allow early selection of a contractor that may have less impact on limiting competition.

10. *How does the contractor cost out a project yet to be fully designed? How can they give a Guaranteed Maximum Price (GMP)?*

Usually a design/build competition requires the design/builder to provide a GMP with their initial offer. This requires the design/builder to perform a certain amount of design work at risk in the hope of being the successful bidder. Firms are more likely to participate in this type of competition if an Owner is willing to pay for some of each competitor's cost to respond to the RFP. In other alternative delivery methods when a contractor is selected to be involved at the onset, the contractor begins pricing almost immediately, but is unable to provide a GMP until the final scope is established and the design documents are 80 – 90 percent complete.

11. *Are there change orders in a Design/Build process? If so, how does the change orders affect the GMP?*

Change Orders are rare using the alternative delivery methods we are speaking of.

12. *How do you handle the bonding and insurance issues? At what point is the contractor required to produce performance & payment bonds and an insurance certificate? How do you assure that the project has adequate coverage?*

Bonds and insurance are handled in the same manner as Design-Bid-Build.

13. *How do you address the DBE requirements?*

DBE requirements are easily handled. An owner should include their own criteria as well as that required by SCDHEC in the RFP for the project.

14. *When the engineer and contractor are in a Design/Build partnership, there is no longer a system of "checks and balances" between the designer and the constructor. The project sponsor loses its ability to assure project quality, construction oversight and monitoring. How is this "loss" counteracted?*

In many of the alternative delivery methods, the Owner has final say and approval of all aspects of the work. This is one of the key advantages of utilizing these delivery methods, because before making critical decisions on equipment, processes, and other aspects of the work, they receive critical cost, schedule, constructability, life cycle information from the contractor and designer.

15. *In Design/Build, the engineer is no longer accountable to the project sponsor but rather to the "team". How can the project sponsor assure there is no pressure on the engineer by the team to reduce quality criteria or design standards to minimum levels in order to maximize profit?*

As with any project delivery method an Owner must make sure they have only qualified, reputable firms performing the work. An Owner is a much higher risk of a low quality work utilizing tradition Design-Bid-Build, than these other methods that allow greater scrutiny of the bidders.

16. *In our State, we do not perform any type of inspection during construction. Normally, the consulting engineering firm provides inspection services. How is construction inspection independently monitored if the engineer is part of the team?*

There are some jurisdictions in our state where local building official perform inspections of plant work. There are many jobs where a design engineers have little to no involvement. We are performing a plant project for the federal government where there are no inspections by the design engineer. Instead the contract called for a job specific Contractor's Quality Control where we do all submittal review and inspections and the Owner themselves monitors our Quality control. An Owner should make the final determination of the extent of "independent inspections". Their RFP could require that a contractor have a design engineer on site for daily, weekly, monthly inspections.

17. *In our State, we require Monthly Construction Inspection Reports to be submitted to our office. Normally, the consulting engineering firm completes these reports. How can we accept the engineer's certification when he is part of the Design/Build team?*

If included in the RFP, this could be made the responsibility of the design/builder. If one of the other types of deliver methods are utilized then the responsibility could remain the Design Engineer's.

18. *In our state, the consulting engineer certifies that the construction is in compliance with the approved plans & specs in order for DHEC to issue an Approval to Place into Operation. If the engineer is part of the Design/Build team, how is quality control maintained?*

This could, and probably should, be done by the design/builder. That should be one of the benefits realized by utilizing the design/build process. All the responsibility for compliance is the design/builder's. This will eliminate arguments with regard to where the responsibility lies.

19. *How do other states handle the draw process? Who certifies the completed quantities and stored material on the pay requests are correct?*

This should be the Owner, or a party designated by the Owner other than the builder.

HAZEN AND SAWYER
in association with
BLACK & VEATCH

PREPARED FOR: Western Carolina Regional Sewer Authority (WCRSA)

FROM: Hazen and Sawyer / Black & Veatch

PREPARED BY: Bruce Allender / Jeff Wells

DATE: July 24, 2006

SUBJECT: **DRAFT**
Piedmont Regional Wastewater Treatment Plant
Technical Memorandum No. 14 – Project Delivery Alternatives

Executive Summary

The purpose of this technical memorandum is to present potential alternative project delivery methods to be utilized in development of the Piedmont Regional Wastewater Treatment Plant (PRWWTP). Alternative project delivery approaches may offer benefits to WCRSA with respect to the following:

- Shortening the overall project implementation schedule.
- Participation of local contracting firms.
- Lower construction cost than traditional delivery.

The selection of a project delivery method is dependent on many Owner and project-specific definitions, goals, and requirements. Whether the use of alternative delivery approaches would actually provide the potential benefits on the PRWWTP project is dependent upon many factors. A key definition of this project is its new construction, which allows many parallel construction activities as opposed to retrofit construction which often requires the sequential construction of process components in order to maintain existing plant functionality. New construction allows the simultaneous construction of most of the process components and makes it easier for multiple crews and multiple contractors to work on the same site. Simultaneous construction also provides the greatest opportunity to construct more work in a shorter amount of time, assuming manpower and equipment is available. Shortening the project duration, regardless of the project delivery approach, is a key factor in achieving a low project cost.

Several alternative project delivery approaches were considered for the PRWWTP project, and this evaluation estimates that various approaches could reduce the overall duration of the project

schedule by between 3 and 8 months when compared to traditional project delivery. Some forms of design-build delivery require fixing the project cost prior to fully defining project quality and operability requirements. If WCRSA pursues one of these approaches, it is recommended that performance and quality requirements be carefully defined prior to requesting proposals for these project delivery approaches. The maximum potential for schedule compression is by moving forward with design development while determining what, if any, changes to WCRSA's procurement policy would be required to proceed with alternative delivery. Selection of an alternative delivery approach should consider the extent to which WCRSA would be responsible for the commercial risk of multiple contracts and the potential price escalations during the design phase before obtaining guaranteed construction pricing. The qualifications-based design-build approach will require review and, potentially, may require changes to WCRSA's current procurement policy. WCRSA will also have to conduct a qualifications-based selection process to select a design-build contractor before the work can proceed. Because these issues have the potential to extend the project and eliminate the potential cost savings of a compressed schedule, WCRSA should move quickly towards the following action items:

1. Review the flexibility afforded by the current procurement policy and initiate any necessary policy changes to allow alternative delivery.

2. Continue to develop and define project performance and quality criteria such that potential alternative delivery contractors can benefit from understanding WCRSA project goals and requirements.

3. Reach consensus regarding the primary project drivers for the PRWWTP project and define the desired balance between alternative project delivery approaches that limit commercial risk for WCRSA versus approaches that maximize WCRSA input into quality and operability decisions about the project.

1.0 INTRODUCTION AND PURPOSE

This technical memorandum (TM) is one in a series of TMs being prepared for the Preliminary Engineering Report for the Piedmont Regional Wastewater Treatment Plant (PRWWTP) project for Western Carolina Regional Sewer Authority (WCRSA). The purpose of this TM is to present the potential for alternative project delivery methods to be utilized in development of the PRWWTP. Alternative project delivery approaches have the potential to offer benefits to WCRSA with respect to the following:

- Shortening the overall project implementation schedule
- Allowing broader participation of local contracting firms
- Lowering project construction costs

The selection of a project delivery method is dependent on many Owner and project-specific definitions, goals, and requirements. Whether the use of alternative delivery approaches would actually provide the potential benefits on the PRWWTP project is dependent upon many factors. A key definition of this project is its new construction, which allows many parallel activities. Retrofit construction often requires the sequential construction of process components in order to maintain existing plant function. New construction allows the simultaneous construction of most of the process components and makes it easier for multiple crews and multiple contractors to work on the same site. Simultaneous construction also provides the greatest opportunity to construct more work in a shorter amount of time, assuming manpower and equipment is available. Shortening the project duration, regardless of the project delivery approach, is a key factor in achieving a low project cost.

This discussion will present an evaluation of different alternative project delivery models for the PRWWTP project, including an analysis of schedule impacts as well as an assessment of other project development implications.

2.0 LEGISLATION, ADMINISTRATIVE AND LEGAL CONSIDERATIONS

WCRSA will need to determine the applicability of the rules and requirements that govern procurement for the PRWWTP. Specifically, it is unclear as to whether WCRSA's recent updates to its procurement code allow the flexibility to implement the full range of alternative delivery

approaches under consideration. These legal issues should be addressed by WCRSA's legal professionals, and should also take into account any procurement limitation relative to how the funding has been obtained by WCRSA to support the design and construction of this facility. Discussions with WCRSA staff and a review of correspondence between staff and WCRSA attorneys have indicated that a delivery method other than the traditional design-bid-build approach or a program management approach to design-bid-build will likely result in some type of legal challenge unless there is a specific, legally required compliance schedule or some other project driver that cannot be achieved using these traditional approaches. While such project drivers have not been identified for this project, because alternative delivery has the potential to result in a shortening of the overall project implementation schedule, and the potential for lower project costs associated with a shortened schedule, an alternative project delivery approach should be investigated further. In addition, it should be recognized that an alternative delivery approach would require development of the necessary procurement documents (i.e. request for proposals), selection procedures, contracts, and other administrative efforts.

3.0 DESCRIPTION OF PROJECT

The PRWWTP will be a 4 mgd regional wastewater treatment facility. Development of this new treatment facility will allow decommissioning of two smaller facilities and provide for future growth in the service area. The new regional treatment plant will be constructed on property recently acquired by WCRSA, and there are no existing facilities that could interfere with construction activities or that would have to be maintained in operation during construction of the new plant. This project is well suited to simultaneous construction of the various treatment unit processes, and this can result in a shorter project implementation schedule than construction of an upgrade to an existing facility in which operation of treatment processes must be maintained during construction. Refer to Technical Memorandum Numbers 1 through 10 for additional technical information regarding the proposed treatment plant.

4.0 DELIVERY METHODS FOR TREATMENT PLANT PROJECTS

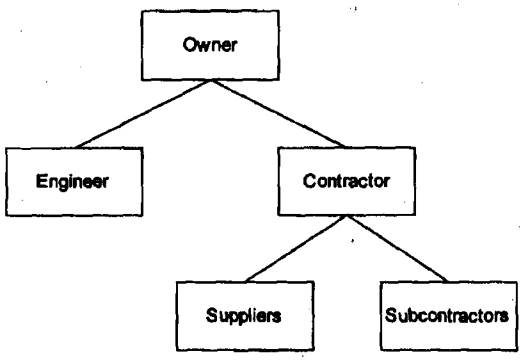
Historically, implementation of municipal projects throughout the United States has been accomplished using established procurement methods that have generally involved the selection of

designers separate from contractors. With the emergence of "integrated contracting" in municipal project delivery over the past 10 to 15 years, procurement methodologies practiced in other industries have been introduced into the municipal marketplace. These methodologies have subsequently been adapted and modified by a number of municipalities around the country. Many of these new procurement methods offer Owners the flexibility for adaptation to agency-specific needs as well as project-specific requirements. As a result, the terminology used to describe today's procurement methods often varies from one location to another and has the potential to cause confusion amongst designers, contractors, Owners, elected officials, and the public. In particular, the term "design-build" carries different meanings to different people.

In order to facilitate a common understanding of delivery options for the PRWWTP, the terminology and basic definition for each delivery option considered in this Technical Memorandum are defined and described in the following paragraphs.

4.1 DESIGN-BID-BUILD (DBB). This is the traditional method of procurement used by public agencies throughout the United States. Using this method, the Owner will select an architect or engineer under a professional service agreement to prepare 100% complete plans and specifications for public bidding. Through a formal bidding process, the Owner receives sealed bids from construction contractors. A bid opening is typically conducted, at which time the bids are opened by the Owner and read aloud. The project is then typically awarded to the bidder that offers the lowest price, provided the bidder is deemed both responsive and responsible. This structure is depicted by Figure 1.

Figure 1. Design-Bid-Build Structure (DBB)

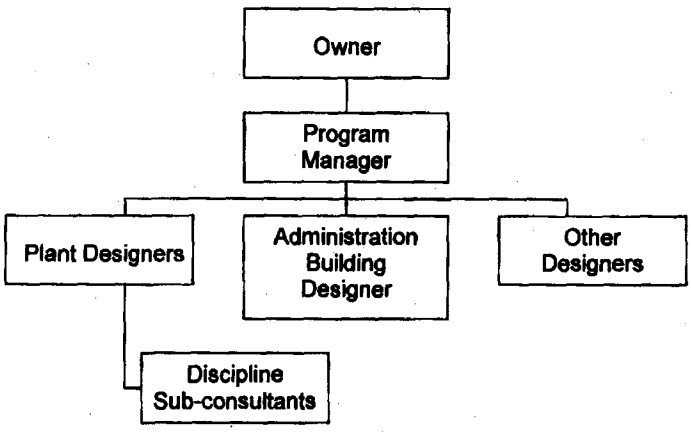


4.2 PROGRAM MANAGEMENT (PM). Program management is a project delivery method in which the Owner employs a third-party program manager (Project Manager) to coordinate and manage the complete project on behalf of the Owner, using either the design-bid-build, a design-build approach or a mixture of the two approaches. The program manager would work with various engineering firms to design various components of the project, which in the case of the PRWWTP could include the update/replacement of Piedmont Pump Station No.4, collection system pipelines, upgrades at the Grove Creek Pump Station, the new wastewater treatment plant, and associated administration facilities. The program manager, with the Owner, would then determine which components of the project would be delivered in the more traditional manner and which parts of the project would be delivered by alternative delivery. The various contracts would then be administered by the program manager on behalf of the Owner.

With this type of delivery method, the Owner employs the program manager on a "fee for service" basis; therefore, the program manager does not have an "at risk" position in the delivery of the project. The Owner still contracts with the various engineering firms and local construction companies, and any cost overruns or schedule impacts would be to the Owner's account for this type of delivery method. One benefit of this delivery method is that it would provide the wastewater treatment expertise of national wastewater engineering firms while including local engineering firms to a greater extent than in the typical traditional delivery approach. However, the Owner would still be fully exposed from a commercial perspective in the delivery and implementation of the project.

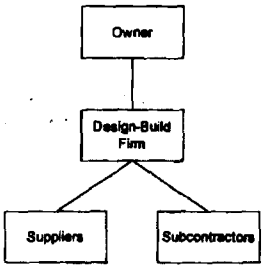
The Program Management project structure is depicted by Figure 2.

Figure 2. Program Management Project Delivery



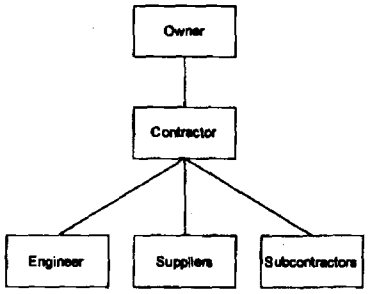
4.3 DESIGN-BUILD (DB). As previously noted, the term "design-build" is widely used as a "catch-all" term for various forms of alternative project delivery. In the water and wastewater marketplace, there is a variety of procurement philosophies, contracting arrangements, and design-build structures. The organizational structure of the design-builder can vary for a given project, depending upon the nature and size of the project, the capabilities of the participating companies, and the Owner's design-builder selection process. Three common organizational structures observed within the municipal water and wastewater industry are described below.

Figure 3. Design-Builder Structures



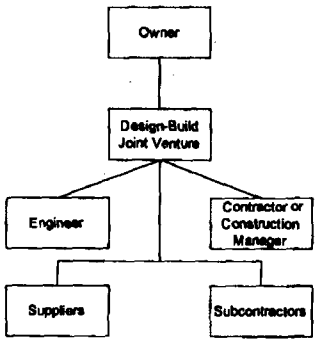
Integrated DB Firm

Integrated DB Firms. Many design-build projects are performed by integrated design-build firms that have both design, engineering and construction resources within a single company. These firms offer "one-stop shopping" because the DB firm can work with the Owner to develop the project from concept through completion.



Contractor Led Team

Contractor-Led Team. This structure is normally led by a general contractor with a consulting engineering firm working in a subcontract role to provide design services and assisting with the permitting activities. The consulting engineering firm may have a lesser level of project involvement with this model. This model is commonly successful when Owners use a competitive price as the basis for design-builder selection.

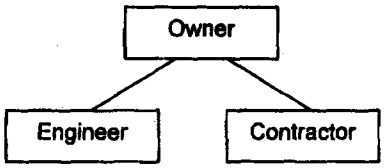


Integrated Joint Venture Team

Integrated Joint Venture Teams. This structure consists of a business arrangement between an engineering firm and a construction company. The two companies are normally liable to one another, and they share in costs, profits, and losses of the project. The two companies may have equal or differing percentages of sharing (i.e., 50/50 or 80/20). However, the nature of the business arrangement means that success for either company is tied to the overall success of the project. The engineering firm will generally have a greater level of project involvement with this model than with the contractor-led model previously described.

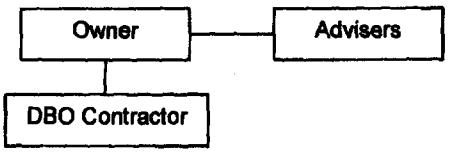
4.4 CM "AT RISK" (CMAR). The "at risk" alternative delivery mechanism is a "hybrid" alternative delivery between design-bid-build and design-build. The Owner still holds the contractual paper for both the engineering-only services and construction management "at risk" contract in the same manner as the design-bid-build delivery mechanism for the engineer and general contractor. However, the contractor becomes part of the project team during the early design phase of the project and, at a point in design as determined appropriate by the Owner, the contractor provided the Owner with a guaranteed maximum price (GMP) for the project. The CMAR contractor is then responsible for delivery of the completed project within the GMP. The engineer's role in a CMAR project delivery differs from that in a traditional project delivery approach in that the engineer would provide design documents for various project components and sub-systems in packages as dictated by the CMAR contractor and before completion of design of all of the project components. The engineer would typically continue services during construction as the Owner's technical representative.

Figure 4. Typical CMAR Structure



4.5 DESIGN BUILD OPERATE (DBO). The DBO delivery mechanism offers the Owner the alternative to contract with a single company or joint venture that has the responsibility to not only design-build the project, but also operate it on behalf of the Owner for a defined period of time (typically 5 to 25 years).This mechanism is usually implemented when a utility has very little operating experience of a treatment technology or no operation experience of treatment facilities.

Figure 5. Typical DBO Structure



4.6 BUILD OWN OPERATE TRANSFER (BOOT). Implementing this business structure requires a development company which can find parties to contribute equity and debt to the project. The development company must also have the ability to manage the design-build of the project and operate the plant for some defined period. This operation period can vary from typically 15 to 25 years, depending on the deal structure and outsourcing of the operation period decided by the Owner.

This procurement method can be expensive due to the potential number of "specialty" advisors that the Owner would need to engage for this type of delivery method to ensure that is was getting good value. The BOOT business arrangement has been most commonly used for projects where the agency or utility cannot fund the equity or provide the debt at competitive commercial rates.

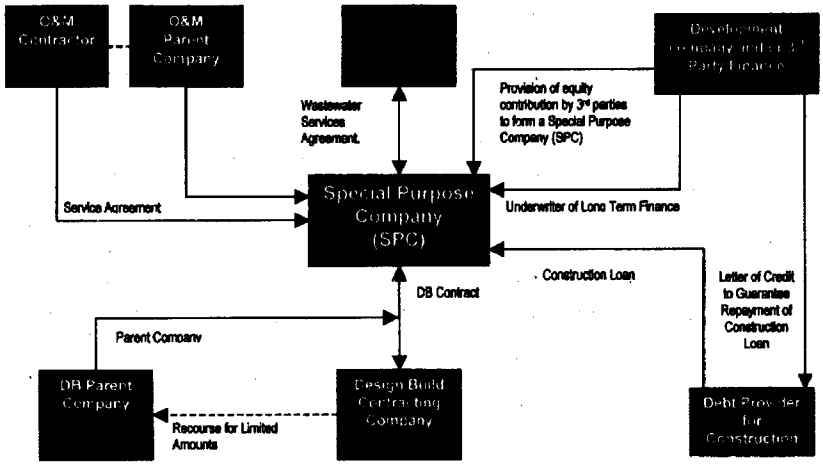
Figure 6 shows a typical BOOT arrangement along with the contractual obligations that need to be in place before financing could take place. The critical agreement for a BOOT scheme will be the wastewater service agreement. This agreement will structure the deal between utility and developer(s) for the scheme. It will also structure the deal between the equity and debt providers establishing the contractual commercial flow-down criteria to the design-build and operation and maintenance contractors. The experience of the design-builder and the operation and maintenance contractor will be of critical importance to the equity and debt providers for the project to ensure that firms with established reputations for cost control, delivery, and performance are executing those contracts.

The specific business deal associated with the project will be substantially dependent on the risk allocation set and agreed between the Owner and the developer. This risk allocation will dictate

what skills the developer will need to have in-house or subcontract to arrive at a commercial structure that is cost effective and meets the expectations of the Owner for the project.

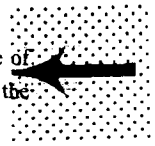
This procurement mechanism would involve a value-based selection after a first step of short-listing of companies or consortiums on their experience in delivery of BOOT schemes for other projects. The Owner would expect to see international companies participate in this delivery mechanism. Most BOOT schemes in the water and wastewater industry have been successfully implemented internationally. Domestically in the USA, there has been little activity in procuring commercial BOOT schemes from the private sector. This has been due to the fact that financing capital projects through bonds in the USA has been a cheaper financing source. This procurement mechanism can also be politically sensitive due to the potential of foreign ownership for a critical asset.

Figure 6. Typical BOOT Structure



4.7 DESIGN-BUILD PROCUREMENT SELECTION. The most profound factor affecting the organization, planning, and execution of project procurement using design-build delivery is the Owner's method for selecting the design-builder. This procurement selection is not relative if the options of design-bid-build or program management are chosen. Method of selection is an important

early step, because it defines the Owner's responsibilities in development of the project particulars, establishes the sequence of activities for the procurement process, and shapes the content and structure of the contracting documents. In addition, the selection process can greatly influence the nature of the working relationship between the Owner and the design-builder for the life of the project.



"The Design-Build Contracting Guide" (DBIA 510) published by the Design Build Institute of America (DBIA) outlines four generalized approaches to design-build contracting, including the following:

Direct Selection. The design-builder is chosen directly by the Owner, based on qualifications and previous experience.

Competitive Negotiation. Several prospective design-builders compete based upon a combination of factors, including qualifications, experience, and general cost criteria such as engineering fees, management fees, and general conditions.

Cost/Design Competition or "Best Value." The prospective design-builders are short-listed based on qualifications and selected through a response to a Request for Proposal (RFP). Selection is typically based upon an evaluation system rating both the technical proposal and the bid price.

Cost Competition. The prospective design-builders are short-listed based on qualifications and selected through a response to an RFP. Proposals are evaluated on whether they meet the criteria detailed in the RFP. Award is made to the low price that meets the technical requirements.

In simplistic terms, when using the ***"Direct Selection"*** or ***"Competitive Negotiation"*** approach, the Owner first selects a design-builder and then typically works with the design-builder through a conceptual or preliminary design phase to develop the scope and requirements for the project. The design-builder then conducts a competitive bidding process for equipment, materials, subcontracts, etc., and then negotiates with the Owner for the cost of construction.

Alternatively, when using a ***"Cost/Design Competition"*** or ***"Cost Competition"*** approach, the Owner must undertake an initial effort to develop scope documents to obtain proposals and bids. The

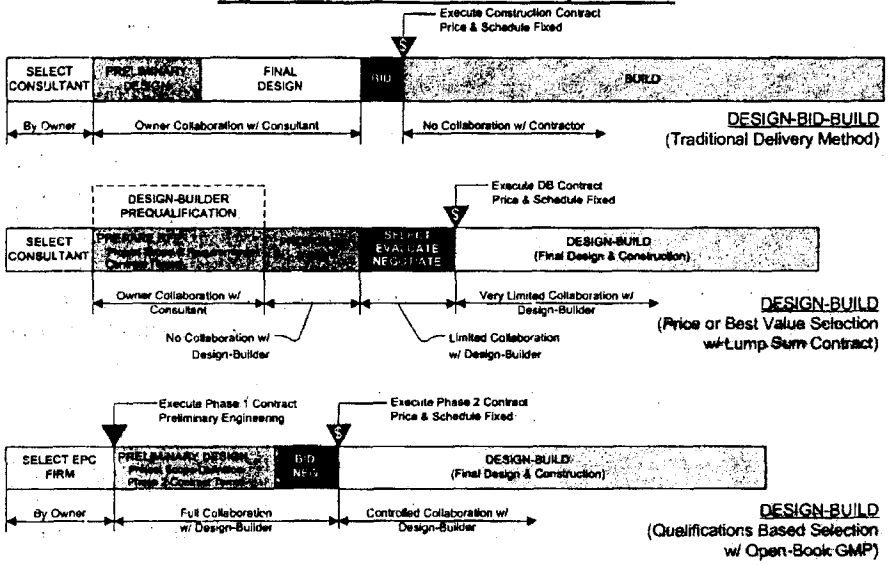
documents typically consist of a detailed RFP along with supporting documents to accurately define the project scope, requirements, and expectations. The competing design-builders then prepare conceptual designs based on their interpretations of the RFP document and submit bids for complete design and construction of the project.

In the municipal water and wastewater marketplace, the four methods of design-builder selection outlined in DBIA 510 can generally be lumped into one of two categories which, for purposes of this study, will be referred to as:

- Price or Best Value Selection (P/BVS)
- Qualifications Based Selection (QBS)

For the purpose of general comparison, the sequencing of procurements is summarized in Figure 7, along with traditional DBB.

Figure 7. Comparison of Delivery Methods



4.7.1 Price or Best Value Selection (P/BVS). The P/BVS approach represents a more orthodox or parochial approach, more akin to the traditional DBB procurement philosophy. Using this model, the Owner generally contracts with a consultant to develop a comprehensive RFP that defines the project scope, project requirements, performance guarantees, and the Owner's expectations with respect to aesthetics, functions, features, redundancy, materials of construction, and overall performance.

The RFP for a competitively bid project generally includes the following elements:

Contract Documents:	Agreement, terms, and conditions for design-build, insurance forms, bond forms, EEO documents, etc.
Technical Requirements:	Typically consists of written project scope, design criteria, level of redundancy, acceptable materials of construction, aesthetic requirements, performance requirements, and guide specifications.
Technical Information:	Typically consists of existing drawings (if applicable); topographic mapping; geotechnical report or soil borings; previous engineering reports and studies; utility information, permits and/or permitting information; and other information or documents pertinent to the project.

On major projects, Owners will typically pre-qualify a limited number of design-builders in advance of issuing the RFP. However, since the design-builders are competing heavily on the basis of price, they will aggressively seek to satisfy the minimum requirements of RFP documents with an emphasis on getting to the lowest price. Therefore, success using this model is heavily dependent upon the ability of the Owner (typically working with an engineering consultant) to develop an RFP that thoroughly defines the requirements and expectations for the project. As a result, Owners often spend four to eight months developing the RFP documents to get the necessary input from engineering, operations, and maintenance staff. The challenge is to produce RFP documents that define the project to the degree necessary to ensure that the bids and proposals received will meet the Owner's expectations without eliminating the potential for creativity, innovation, and cost savings.

Once the RFP has been issued to the pre-qualified design-builders, each will prepare their own preliminary design based on their interpretation of the RFP, develop pricing, and formally submit a bid and proposal. Bids are typically submitted in a lump sum format. On major projects, the proposal/bid period is typically three to four months to allow design-builders sufficient time for

developing a preliminary design and a cost proposal, and the Owner will then typically require an additional four to six months to complete the evaluation process and make the award.

Communications during the bid and proposal process are similar to traditional DBB procurement in that bidder contact with the Owner is generally limited to questions at a prebid conference and written questions which are addressed by formal addendum to all bidders. As a result, the Owner generally does not develop a working relationship with the design-builder until after the price is established and the contract is executed.

Price and Best Value methods of selection are generally conducted in the same manner. However, the Best Value Selection attempts to take into account both the technical solution and the price. In addition, when using Best Value, the Owner may also allow a greater degree of negotiation with respect to technical scope and commercial matters prior to contract execution.

In general, design-build delivery creates opportunities to reduce the overall project schedule. These include the following:

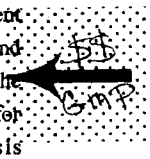
- The design-builder can initiate equipment orders with suppliers during detailed design. This can be an advantage because the long lead times associated with procurement of custom fabricated process equipment can sometimes drive the project completion date.
- Vendor engineering for process equipment is then concurrent and interactive with the design-builder's detailed design activities, thereby accelerating production of equipment submittals, fabrication, and delivery.
- Construction often commences prior to the completion of all design activities, resulting in an overlap of the design and construction schedules.
- The integration of engineering and construction increases the speed of decision making, submittal approval, and resolution of technical and construction issues.

However, the schedule compression that is often achieved by the design-builder through integration of engineering, procurement, and construction is frequently offset to a great extent by a long period of front-end development needed by Owners to prepare the RFP, obtain bids/proposals, evaluate, select, and negotiate the contract with the design-builder.

4.7.2 Qualification Based Selection (QBS). This procurement method uses a qualifications-based selection (QBS) with an open-book GMP project costing approach, and a two-phase contract is frequently used. Phase 1 typically includes preliminary engineering, initial permitting, and bidding activities to develop and negotiate the GMP. Phase 2 includes detailed design, completion of remaining permitting approvals, construction, and commissioning activities. This approach is popular in process industries because it enables Owners to secure commitment to price and schedule early in the design phase of the project.

In comparison to the P/BVS approach to design-build procurement, the QBS approach offers the same opportunities for overall schedule reduction, but also allows the Owner to place more emphasis upon project quality and ease of operation and functionality for the PRWWTP operating staff. A QBS approach to design-build also provides opportunity for the Owner to direct the project towards greater use of local engineering and construction firms while retaining the benefit of a more rapid delivery schedule.

Using this approach, the Owner selects the DB contractor with the capability to perform both design and construction as the prime contractor (integrated DB structure as outlined in Figure 3) based on qualifications or a combination of qualifications, engineering, and management fees. The DB contractor then works closely with the Owner to develop and refine the scope of the project through the initial permitting and preliminary design phase. At a predetermined point in the design phase, the DB contractor will obtain competitive bids for all major equipment and subcontract work. The bid tabulations are shared with the Owner, allowing the Owner to review the results and possibly make choices regarding suppliers and subcontractors if desired (and allowed by applicable procurement statutes). A guaranteed maximum price (GMP) is then negotiated, and the detailed design and construction of the project proceeds on an "open-book" basis. The Owner pays the actual cost of the construction work (equipment, materials, and subcontracts) plus any negotiated fees for management, overhead, and profit. If the final cost of the project is less than the GMP, the savings is typically shared by the Owner and the DB contractor. If the final cost of the project exceeds the GMP, the overrun is borne by the DB contractor. This approach may allow the involvement of local engineering and construction firms, where practical. Typically when this approach is adopted, there may be between two and ten construction packages awarded to the local construction industry. The number of construction packages will depend on the local construction industries' capability to deliver the project components in a cost-effective manner and within the defined schedule. The design-build contractor will manage the coordination of the subcontract packages in an 'at risk"



position to ensure that WCRSA has a single point of responsibility to coordinate for delivery of the project.

4.8 OWNER'S AGENT OR PROJECT MANAGER. One of the considerations with alternative project delivery is whether the Owner has the capability to oversee the alternative delivery process completely in-house, or whether an Owner's agent or third-party Project Manager may add value to the Owner by providing administrative, engineering, and technical input on behalf of the Owner. Because several of the alternative delivery approaches require establishment of the project cost at a very early phase of design, the DB contractor has great incentive to make cost decisions that may sacrifice quality or ease of operation. Several of the alternative delivery mechanisms where an Owner's agent would add significant value to the Owner in implementation of the procurement and delivery of the project are as follows:

- Design-Build using best value selection.
- Design-Build using price or low cost selection.
- Design-Build-Operate.
- Construction Management "At-Risk."
- Build-Own-Operate-Transfer.

All of these delivery mechanisms require a design-build contractor to provide a cost of work to the Owner up front after a three- to four-month bidding period. This results in a significant effort up-front by the Owner to produce and develop documentation that defines the project. Therefore, the engineer works with the Owner to define the project in sufficient detail in terms of scope, project quality, preferred manufactured equipment, construction standards, project controls and operation standards along with defining a commercial contract that allocates risk to ensure best value to the Owner. This work to define the project requirements protects the Owner against project cost and schedule claims from the design-build contractor through the implementation of the project. An engineer may similarly act as the Owner's agent to provide project management representation during the construction period to ensure the quality of construction and adherence to the agreed upon design. Alternative delivery approaches in which QBS is used, and establishment of the GMP comes after the project is well defined by the Owner and the DB contractor, may require less project management by the Owner to administrate the alternative delivery mechanism. Whether the Owner would require an Owner's agent during construction using a QBS project delivery would depend upon the Owner's staff availability to provide inspection and technical input during the construction.

5.0 DELIVERY CONSIDERATIONS FOR PIEDMONT REGIONAL WWTP PROJECT

5.1 TREATMENT PLANT IMPLEMENTATION SCHEDULE. In order to evaluate the potential schedule benefits of the various alternative project delivery approaches for the PRWWTP, an initial baseline schedule was developed based on traditional DBB project delivery. Once the baseline schedule was established, alternative schedules were developed for the various QBS and P/BVS design-build models, incorporating consistency in the duration of similar activities and experience-based estimates of the durations of differing activities.

As of July 2006, the preliminary engineering report for the PRWWTP is complete and ready for submission for regulatory approval. With traditional DBB delivery, the project could move forward to detailed design beginning in August 2006. For alternative delivery approaches, WCRSA will have to address legal issues relative to alternative procurement. For the purposes of this evaluation, it is assumed that these issues can be fully resolved and project documentation can be developed to solicit alternative delivery proposals by January 1, 2007. While the traditional DBB approach typically has a longer overall project schedule due to sequential design and construction, the procurement steps necessary to enter an alternative delivery contract arrangement for the PRWWTP will offset some of the typical overall project schedule compression associated with alternative project delivery. The estimated project durations and completion dates are listed in Table 1.

Table 1 - Completion Dates for Treatment Plant Facilities

Delivery Method	Project Duration	Estimated Completion Date (Note 3)
Traditional Design-Bid-Build (DBB)	42 Months	February 2010
Program Management (PM)	34 Months	June 2009
Price or Best Value Selection (P/BV)	34 Months	November 2009
CM at Risk (CMAR) w/ GMP (Note 2)	28 Months	May 2009
DB/w GMP (QBS) (Note 1)	32 Months	September 2009

Note 1- Conversion to a GMP is at 30% design.

Note 2- Conversion to a GMP is at 60% design.

Note 3- Estimated Completion Date is based on starting the (P/BV) and (QBS) alternative delivery procurement from January 2007, and starting DBB, PM, and CMAR from August 2006.

As shown in Table 1, the use of some form of alternative project delivery has the potential to shorten the project duration by between 3 and 8 months. The shortening of the overall project duration has the potential to reduce the project construction cost for WCRSA. It should be noted that the potential to shorten the project duration is related to how quickly the procurement legal issues can be resolved for the various delivery methods and how quickly WCRSA could then move through the procurement process. The underlying assumptions for the estimated completion dates shown in Table 1 are described in more detail below.

Design-Bid-Build (DBB): The baseline DBB project schedule reflects an 18-month period of time required for permit finishing, final design, final approvals, bid, and award. This is followed by a 24-month construction period, including all plant startup and commissioning activities. Although the total project duration is longer for this approach, the anticipated project completion is not significantly longer than for other approaches because it is anticipated that this approach could be initiated earlier than the other project delivery approaches.

Program Management: The Program Management schedule would not be any longer than the DBB schedule for completion of all facilities and, as conceived, it would be shorter than traditional DBB delivery. By involving local engineering resources as appropriate and by breaking the project into multiple construction contracts of a size that would attract more local construction firms, simultaneous construction of various project components can be achieved. This simultaneous construction approach using program management would rival design-build in terms of shortening the overall project schedule and achieving related project cost savings. It is anticipated that this approach could be initiated on the same timeline as traditional DBB delivery and that design activities could be completed in 14 months. Simultaneous construction of project components would shorten the total construction period to 20 months.

Price or Best Value Selection (P/BVS): The schedule for the P/BVS approach is based on WCRSA finalizing procurement arrangements, and the engineer developing the project scope and request for proposals (RFP) documents for obtaining design-build bids/proposals by January 1, 2007. It is anticipated the bid/proposal period would be four months for this approach because the DB contractors have to develop a price proposal for the project as part of their proposal. This would be followed by a four-month period for evaluation, selection, and negotiation of the design-build contract and board approval. The summation of these activities results in a total

duration of 8 months to develop the project and contract with a design-builder from the January 2007 start date. The minimum duration of the design-build period is then anticipated to be 26 months.

Construction Management "At Risk" based on Qualification Based Selection (QBS): This schedule is based on QBS selection, along with a two-phase contract and open-book GMP structure. This approach would enable WCRSA to rapidly select the construction firm in a manner similar to selecting a design consultant. WCRSA's procurement code currently provides for CMAR project delivery. It is anticipated that an RFP would be issued in October 2006 and selection and board approval of the CMAR contractor could be achieved by January 2007. The engineering design could continue to be advanced during the selection process for the CMAR contractor and, once on board, the CMAR would work with the Owner and the engineer to further the design to the point that a GMP can be provided. The anticipated design collaboration period to reach a GMP at 60% design is approximately eight months. The duration of construction and commissioning is anticipated to be approximately 20 months.

Design-Build based on Qualification Based Selection (QBS): This schedule is based on issuing a RFP by January 2007. Similar to the CMAR approach, the bid/proposal period would be two months followed by a two-month period for evaluation, selection, and negotiation of the design-build contract and board approval. The DB construction firm will then work with WCRSA through the preliminary design and GMP approval, for which the anticipated duration is approximately eight months. The duration of the detailed design, construction, and commissioning is anticipated to be approximately 20 months.

6.0 PROJECT COST IMPACTS AND INNOVATION

It is essential to decide early in the project development on the project procurement approach to be used. Potential for cost savings through alternative project delivery approaches is largely related to the ability to shorten the project schedule and potentially for the builder to assist in value decisions through early involvement in the project. Figure 8 below outlines that the earlier the Owner, engineer, contractor, and/or design-builder can work together, the more likely that cost innovation through process selection, layout, and scheduling of the work can be achieved. This early

involvement will ensure that the Owner receives a project that incorporates potential value that the contractor or design-build team can bring to the process.

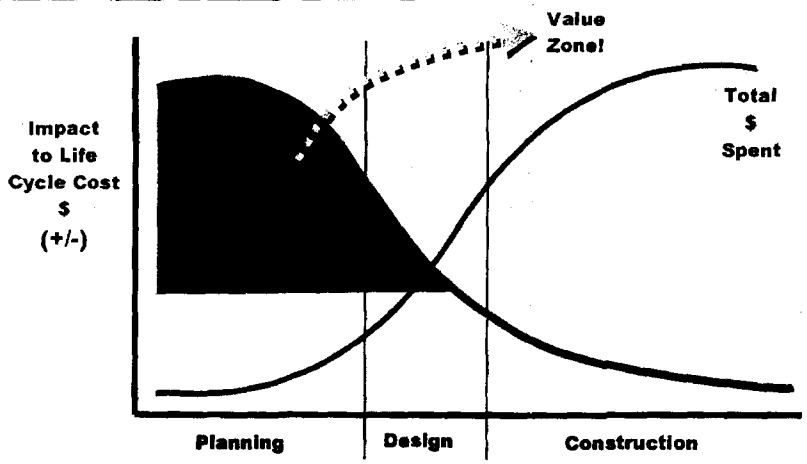
In considering the procurement mechanism, the Owner needs to decide what project management and procurement capability it has, either in-house or with its advisors on the project, and the amount of up-front investment it wants to make on procurement of the project. Based strictly on schedule-related cost savings, the least cost to procure a project would be Construction Management "At Risk" or Program Management project delivery. Other alternative delivery approaches would result in slightly longer project durations, with traditional design bid build requiring the longest overall project schedule. Other factors must also be considered, such as potential for the need for professional services in an Owner's agent role for some of the alternate delivery approaches, and the relative impacts of competition on the various approaches. The Owner will also need to assess how busy the marketplace is in terms of regional construction work. The ease, and cost, of submitting a proposal on a project in a busy marketplace will influence the decision of whether to propose for construction companies. Some of the alternative delivery approaches could result in less market competition due to fewer contractors with alternative delivery experience and/or lesser willingness to invest in preliminary design costs to develop an alternative delivery proposal.

6.1 DESIGN-BID-BUILD AND PROGRAM MANAGEMENT: As the base option for delivery, the Owner and engineer will produce plans and specifications in isolation to the contractor. Therefore, interaction with the contracting community will most likely take place at 100% design-completion, leaving little opportunity to realize any cost savings with respect to constructability and schedule. Reputable national engineering firms perform in-house constructability reviews, which have been successful. In this procurement process, the contractor will bid on the tender documents produced, and the project will usually be awarded on the lowest cost. The contractor, through this delivery mechanism, will most likely only cost the project to the plans and specifications produced by the engineer and will contribute little innovation in terms of constructability review to the project. This disadvantage could be overcome by WCRSA hiring a contractor as a special consultant or a third-party value engineering firm to perform reviews and provide input during the design process.

6.2 PRICE AND BEST VALUE SELECTION (P/BVS): If this delivery mechanism is selected, then again, the Owner and the engineer will make certain early engineering decisions to select the process and preliminary layout and produce bidding plans and specifications, which will most likely be developed to 30% complete for the pre-qualified bidders to tender upon for the project. The

development of the plans and specifications to a 30% complete level results in the design-builder having less input into the project in the "value zone" of the project in terms of the constructability of the project. Therefore, with less interaction in the value zone of the project, there is potentially less innovation brought to the project in terms of layout, constructability, cost, and scheduling in the best value selection. The Owner usually requires the design-builder to bid the base bid with an option to bid an alternative. This is required to establish a baseline for bid evaluation of the selected bidders, which could result in more innovation in scheduling and layout than the traditional design-bid-build approach, but less innovation and value to the Owner than a qualifications-based selection. At the same time, the fact that the contractor is selected based on price or best value early in the process means that the Owner has little control or ability to influence quality after the 30% design point while maintaining competition in pricing.

Figure 8. Cost Impact versus Timeline



6.3 CONSTRUCTION MANAGEMENT "AT RISK" BASED ON QUALIFICATION BASED SELECTION (QBS): This type of delivery mechanism has the potential to bring the Owner, engineer, and general contractor together early into a project to get early feedback on the schedule and constructability of a project in the value zone. For this project delivery mechanism to work effectively, the general contractor must be open in the discussion of the constructability and schedule of the project. Some Owners do not require the general contractor to give them a Lump Sum or GMP until the design is

90 to 100% complete.

A strategy of late conversion to a GMP results in the loss of the advantage of alternative delivery. In a late conversion approach, very little cost and/or schedule benefits can be realized as compared to traditional project delivery. Therefore, if construction management at-risk is used to maximize the cost benefits associated with shorter schedule, the GMP or lump sum must be established early in the design, at 30 to 60% of design completion. With this early lock-in of the GMP, the Owner relinquishes a level of control or ability to influence quality in the latter phases of design without incurring change order costs.

This approach has a two-contract delivery mechanism similar to traditional delivery, so the scope and design must be managed by the Owner to ensure that both the engineer and construction companies have a common understanding to the stakeholder(s) outcome. If there is not a common understanding of the project requirements, then the Owner runs the risk of receiving change order claims from the general contractor with this approach.

6.4 QUALIFICATION BASED SELECTION OF DESIGN-BUILD CONTRACTOR (QBS): If this delivery mechanism is used to procure the project, then the Owner is selecting a DB contractor with design and construction capability up front before commitment of final construction cost. Project decisions being made with the Owner and the design-builder would take place in the "value zone" time period of the project, and a GMP would be established early in the project. The advantage of this procurement process from a cost perspective is that early interaction on process, layout, and constructability may result in more optimized design solutions. In addition, critical path equipment with long lead times for delivery may be identified early in the project. This allows early procurement planning, which may shorten the project schedule, resulting in cost benefits to the Owner. Unlike the construction management at risk approach, this alternative project delivery method provides a single point of responsibility with the design-build team.

7.0 QUALITY ISSUES

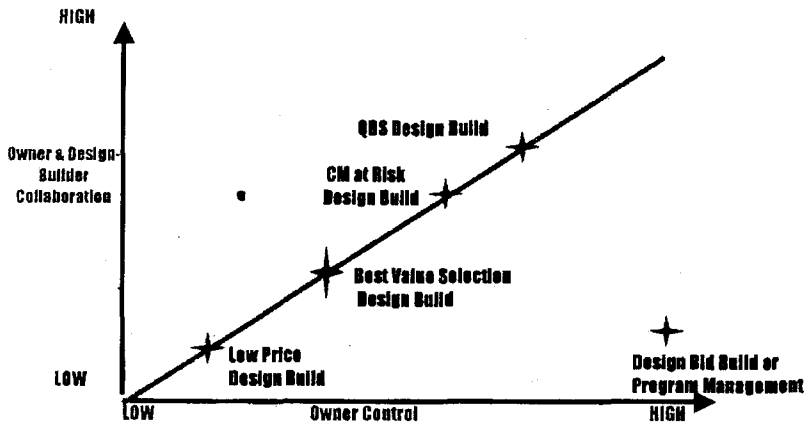
Some Owners have questions in regard to control of the quality of work through alternative project delivery. Figure 9 shows the varying levels of Owner's control with various project delivery mechanisms.

Both the traditional Design-Bid-Build approach and the Program Management Approach provide the Owner a high level of control over the project. These approaches typically forfeit input of the builder into the design process. This disadvantage could be addressed by retaining a reputable builder to provide input during the design process on a fee basis. These approaches allow the Owner to be very involved in equipment selection, and the requirements and quality of the work can easily be incorporated into the contract documents.

Using the best value and price-based selection delivery mechanisms, the Owner and the engineer need to ensure that they have clearly communicated equipment and construction quality requirements in the preliminary plans and specifications for the project. Along with ensuring good quality specifications, the Owner may potentially pre-qualify only companies that can show not only a history of past performance, but also a history of quality workmanship, safety, and financial capability.

With quality-based selections, the Owner is ensuring early contact with the design-build team on an open-book basis and can, therefore, be very involved in the equipment selection and the selection of the contractor or subcontractor to deliver the quality of work that is required and expected for the project. After the GMP is established in a quality-based selection, Owner input is reduced as compared to traditional delivery approaches but is still much higher than with price or best value design-build approaches.

Figure 9. Levels of Owner Control with Various Delivery Mechanisms



8.0 SUMMARY AND RECOMMENDATIONS

Various forms of alternative project delivery of the PRWWTP could reduce the overall duration of the project schedule by between 3 and 8 months when compared to traditional project delivery. Some forms of design-build delivery require fixing the project cost prior to fully defining project quality and operability requirements. If WCRSA pursues one of these approaches, it is recommended that performance and quality requirements be carefully defined prior to requesting proposals for these project delivery approaches. Maximum schedule reduction can be achieved if WCRSA can move forward with design and either enter into a construction management at risk contract or Program Management alternative project delivery. Alternatively, a P/BVS approach or qualifications based selection design-build can also lead to schedule reductions provided the duration of the front-end development period is carefully managed to prevent erosion of the time available for the actual design and construction of the project. These alternative approaches can primarily develop potential for cost innovation to the extent that they can result in shortened project schedules. Use of the design-build approach in any of its variations will place considerable pressure on WCRSA staff for timely decision making during the design development phase of the project in order to achieve the

desired positive schedule impacts and associated potential cost savings. The traditional Design-Bid-Build approach offers the advantage that the design phase could be initiated earlier than the other delivery approaches and WCRSA would not have to develop additional contractual relationships to move forward into the design phase of the project. A Program Management variation on the Design-Bid-Build approach or a QBS design-build arrangement could allow increased involvement of local contractors and, potentially, in increased construction competition. Regardless of the delivery approach selected, if the project is broken down into several construction packages, significant schedule improvements could be obtained.

A summary of the various project delivery approaches considered, along with the differentiators for the various approaches is presented in Table 2 below:

Table 2 – Summary of Delivery Options

	Estimated Completion Date (see Table 1)	Coordination with Owner	Cost Control	Level of Control by WCRSA	Local Engineering & Contractor Participation	Commercial Risk
Design Bid Build	February 2010	2 Contracts	Medium	Maximum	Medium	Borne by Owner
Program Management	June 2009	Multiple contracts	Medium	Maximum	Maximum	Borne by Owner
DB Price/Best Value	November 2009	1 Contract	Maximum	Low	Medium	Borne by DB
CM "At Risk"	May 2009	2 Contracts	Medium	Maximum	Medium	Borne by Owner
DB QBS	September 2009	1 Contract	Medium	Maximum control and collaboration	Medium	Borne by DB
DBO	TBD	1 Contract	Maximum	Low	Medium	Borne by DB
BOOT	TBD	1 Contract	Maximum	Low	Medium	Borne by Owner

Due to the significant reduction in the level of project control available to WCRSA with the DBO, BOOT, and price or best value approaches to design-build, it is recommended that these alternatives not be considered for the PRWWTP project. The maximum potential for schedule compression is by moving forward with design development while determining what, if any, changes to WCRSA's procurement code would be required to proceed with alternative delivery. Selection of an alternative delivery approach should consider the extent to which WCRSA would be responsible for the

commercial risk of multiple contracts and the potential price escalations during the design phase before obtaining guaranteed construction pricing. The qualifications-based DB approach will require review and, potentially, may require changes to the WCRSA's procurement policy. WCRSA will also have to conduct a qualifications-based selection process to select a DB contractor before the work can proceed. Because these issues have the potential to extend the project and eliminate the potential cost savings of a compressed schedule, WCRSA should move quickly towards the following action items:

1. Review the flexibility afforded by the current procurement policy and initiate any necessary policy changes to allow alternative delivery.

2. Continue to develop and define project performance and quality criteria such that potential alternative delivery contractors can benefit from understanding WCRSA project goals and requirements.

3. Reach consensus regarding the primary project drivers for the PRWWTP project and define the desired balance between alternative project delivery approaches that limit commercial risk for WCRSA versus approaches that maximize WCRSA input into quality and operability decisions about the project.

* * *

Stephen P. Graef, PE, PhD, BCEE
Technical Services Director
sgraef@wcrsa.org
561 Mauldin Road, Greenville, South Carolina 29607
Tel: (864) 299-4038 Fax: (864) 299-4003

August 1, 2007

Mr. Jeff Wells
Black & Veatch, Inc.
201 Brookfield Parkway, Suite 150
Greenville, South Carolina 29607

Dear Mr. Wells:

A group of DHEC construction project stakeholders wants your help in proposing new procedures for DHEC permitting and SRF approval when alternate delivery methods are used.

The SC Procurement Code is being updated. It will include alternative delivery methods for building and facility construction such as design/build and construction manager at risk. These approaches deviate from the traditional design/bid/build method for which DHEC normally issues construction permits and approves State Revolving Fund, SRF, loans.

These Code updates will probably take place. Thus there is a business incentive for anticipating potential concerns that DHEC may have and proposing a modified approach for their construction permit and SRF loan approvals. By taking a proactive and comprehensive position, the time required for DHEC to accept and implement new procedures can be significantly shortened.

One way to hasten DHEC acceptance of a new procedure is to have it developed and receive a consensus from the stakeholders affected by it. An effort is underway to involve a cross section of owners, designers and contractors to consider potential DHEC concerns about implementing "alternative delivery methods" and then as a group, proposing solutions to those concerns.

Our thought is to form a team of at least three owners, designers and contractors respectively to work through this process. Recently, DHEC has developed some concerns about Design/Build projects (attached). It is likely that they would have similar concerns for Construction Manager at Risk projects. By having a group of us develop a consensus response, we believe DHEC will likely implement and make alternate delivery methods a reality sooner than later.

I hope you will be able to be a part of the group.

Sincerely,

Stephen P. Graef, PE, PhD, BCEE
Technical Services Director

Attachment

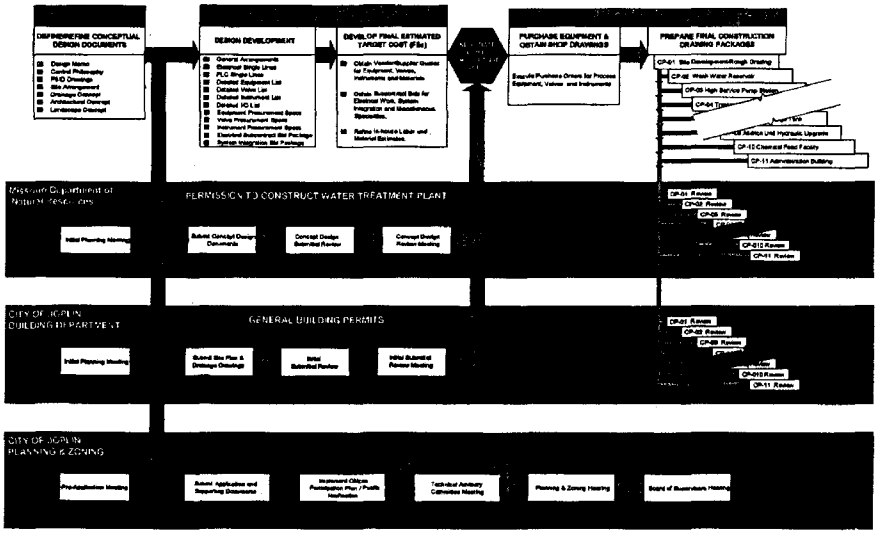
Design/Build Issues

1. *Biddable plans & specs are required for DHEC to issue a Permit to Construct. How do we issue this Permit without approved plans & specs?*

   With Design/Build you still have permits issues on approved plans and specifications (specs), they are just issued to DHEC in a different manner. We call it a phased permitting approach. DHEC would get an overview of the project and then detailed plans and then specs for different parts of the project would be submitted to DHEC in a phased manner. The operations building, maintenance building, clarifiers, solids handling, etc would be all submitted in a phased approach to match the construction execution plan.

2. *How do other states issue a construction permit without a completely designed plans & specs submittal?*

   We have provided a diagram that has been used in Missouri, which is the same as described above.



Bowen / Black & Veatch

3. *Our State regulations require a construction permit prior to performing any construction. Design/Build allows construction to begin before the plans & specs are completed. How can our State allow contractors to begin building prior to the issuance of a construction permit?*

   As described above, plans and specs for various parts are approved, which allows the construction permit to be issued for the project. Any part of the project that is built without plans and specs would be deemed to be not legally compliant with the State regulations.

4. *How do other states allow project sponsors to start construction without a construction permit?*

   Other States don't allow construction to begin without permits; this is why we do phased permitting.

5. *Design/Build allows construction to start ahead of FNSI and permit approval. How does Design/Build deal with costly delays in construction resulting from resolving permitting or environmental issues? How does Design/Build save the project sponsor time and money when these delays occur?*

   All permitting and environmental issues are completed before construction begins.

6. *At what point in the SRF process does the project sponsor procure the Design/Build team? How do you "scope out" what is needed prior to having an engineer on board?*

   It depends on what procurement method - Qualification Based Selection (QBS) or Best Value Selection - is used to appoint a Design/Build firm.

   If the procurement method is QBS, then the design/builder will scope out the work once selected, which is immediately after notice to proceed. An engineering service fee is agreed upon for the full design. To satisfy SRF requirements, the complete price of the project is then worked up competitively through "open book" costing of equipment and subcontracts. Once the price is agreed with the owner, the contract is then delivered to the agreed lump sum price. This price is usually agreed between 60-80% of design.

   If the procurement method is Best Value, the Owner first appoints an engineer and then allows the engineer to work up the scope and preliminary engineering to approximately a 30% design level. The Owner would then procure the design/builder using a two-step process. First Step would be to get DB teams to respond to a Request for Qualification (RFQ).

This allows the Owner to shortlist a maximum of three companies that are qualified from an experience, safety, financial and quality perspective. Once selected, the Engineer and the Owner's advisors compile a Request for Proposal (RFP) that the three (3) qualified teams would propose upon. Selection in the RFP would be based on approach and understanding of the project. The price selection would either be fee-based or a lump-price for the complete project. In some States we are seeing a fee-based price selection on engineering, project management, construction management, start-up and commissioning of a project being submitted, where the cost of the work will be built up in a similar manner as described above for QBS selection.

Which procurement process and which best value process the Owner uses will depend on the procurement laws within its own organization as well as budget and schedule. State laws may also be very prescriptive of the procurement process.

7. *If a project sponsor does not have in-house expertise with the Design/Build process, they may have to retain a Design/Build consultant to assist with preparing the project scope, RFP documents, etc. If this is the case, how does Design/Build save the project sponsor time and money?*

   Design/build is an integrated project delivery approach that generally saves money due to shorter schedule, the ability to determine costs earlier and purchase material and equipment sooner and thus safeguard against commodity risk escalation. If, however, the project is very simple to scope and design, then design/build may not save time or money. Whether or not design/build is right for a particular project will need to be determined by the Owners..

8. *At what point in the SRF process does the project sponsor procure the contractor? How is the contractor selection process competitive? What is the selection process and how is it applied?*

   The design/builder is the contractor, so the contractor is appointed at the same time as the design/builder.

9. *Few construction firms would possess the necessary technical and business skills, financial capability, or experience to participate in Design/Build projects. Also, few firms would have the time or money to invest in preparing Design/Build proposals that may not yield a contract. How do you reverse the inherent tendency of Design/Build to limit competition?*

Design/build does not limit competition. RFP's that are one-sided in favor of the Owner limit participation. This is because market participants do not need to accept these types of contracts given the backlog in the market. Lastly, very few contractors on large projects (whether traditional or design/) will bid a project that is open to unlimited competition because bid preparation costs are relatively high and the likelihood of success is relatively low. Owners need to be concerned with attracting at least three bidders regardless of whether the project is traditional or design/build. Things that Owners are doing today to ensure three qualified bidders are as follows:

- Do a two-step procurement selection, RFQ followed by RFP
- Pay a realistic stipend to the unsuccessful bidders
- Have a fair risk allocation in the contract document
- Allow flexible teaming arrangements in the RFPs, such as Joint Ventures and Consortiums

10. *How does the contractor cost out a project yet to be fully designed? How can they give a Guaranteed Maximum Price (GMP)?*

The design/builder will cost out the work in the following manner:

QBS- Usually this allows the design to be taken to 60% before a price is agreed with the Owner. This allows the design/builder to define further the riskier parts of the project and take the design beyond 60% to safeguard itself against pricing risk. With this method of procurement, the design/builder generally has very few change orders as they are able to work with the Owner in a very collaborative manner throughout the project.

Best Value- The Owner needs to ensure that they have defined all their requirements in the RFP document, which would include preferred equipment suppliers, expectations of quality and the type of architectural finishes it requires, along with plant performance. This allows the design/builder to do some upfront design and costing, which it then puts forward as part of its proposal in response to the RFP. This is usually a costly exercise for the design/builder and this is where a stipend is a good way for the Owner to ensure that contractors will provide a proposal.

11. *Are there change orders in a Design/Build process? If so, how does the change orders affect the GMP?*

Change orders depend on the amount of definition in the RFP, not the method chosen for project delivery. Well defined RFP's do not have

many changes while poorly defined RFP's have many changes and delays. If a project is scoped incorrectly, there will be change orders. For example, this may occur when the project sponsor requires a lump sum bid from the design/builder on 30% plans and specs if these plans and specs do not define the Owner's required performance and quality criteria. If the project sponsor uses QBS selection and the guaranteed price is given at a later period in the design then the change orders will be minimal.

12. *How do you handle the bonding and insurance issues? At what point is the contractor required to produce performance & payment bonds and an insurance certificate? How do you assure that the project has adequate coverage?*

    As with traditional delivery, the design/builder will provide the performance and payments bonds for the construction piece of its price to the project sponsor. Insurance issues are done in a similar manner to traditional delivery.

13. *How do you address the DBE requirements?*

    The DBE requirements need to be identified in the RFQ so that the design/builder can put together its DBE plan as part of its bid in response to the RFP.

14. *When the engineer and contractor are in a Design/Build partnership, there is no longer a system of "checks and balances" between the designer and the constructor. The project sponsor loses its ability to assure project quality, construction oversight and monitoring. How is this "loss" counteracted?*

    On the contrary, with a QBS selection the project sponsor has greater control over the vendor selection and quality of material used to construct the plant. The project sponsor receives a competitive price open-book build up and can make equipment selection choices and quality choices of material through the build up of that cost.

    If procurement is based on best value selection on a full lump sum price, then we would recommend the project sponsor appoint an Owner's Engineer to review the price, approach and proposals of the design/build contractor.

15. *In Design/Build, the engineer is no longer accountable to the project sponsor but rather to the "team". How can the project sponsor assure there is no pressure on the engineer by the team to reduce quality*

criteria or design standards to minimum levels in order to maximize profit?

As the engineer is still the engineer of record they do need to stamp the drawing which will ensure the quality of the work they produce will meet the need of the project.

16. *In our State, we do not perform any type of inspection during construction. Normally, the consulting engineering firm provides inspection services. How is construction inspection independently monitored if the engineer is part of the team?*

    This is done either by the project sponsors' site representative or its Owner's Engineer.

17. *In our State, we require Monthly Construction Inspection Reports to be submitted to our office. Normally, the consulting engineering firm completes these reports. How can we accept the engineer's certification when he is part of the Design/Build team?*

    This is done either by the project sponsors' site representative or its Owner's Engineer.

18. *In our state, the consulting engineer certifies that the construction is in compliance with the approved plans & specs in order for DHEC to issue an Approval to Place into Operation. If the engineer is part of the Design/Build team, how is quality control maintained?*

    This is done either by the project sponsors' site representative or its Owner's Engineer.

19. *How do other states handle the draw process? Who certifies the completed quantities and stored material on the pay requests are correct?*

    This is done either by the project sponsors' site representative or its Owner's Engineer.

North Augusta
South Carolina's Riverfront

REQUEST FOR PROPOSALS

FROM

GENERAL CONTRACTORS

To

CONSTRUCT A 70,000 SF +/-

MUNICIPAL OFFICE BUILDING

GEORGIA AVENUE AT BLUFF AVENUE

NORTH AUGUSTA, SOUTH CAROLINA

The Boudreaux Group

The Boudreaux Group, Inc.

1200 Park Street (29201)

P.O. Box 5695

Columbia, SC 29250

TABLE OF CONTENTS

CITY OF NORTH AUGUSTA
REQUEST FOR PROPOSALS

GENERAL INFORMATION

Project Description

1. The City of North Augusta, South Carolina has purchased approximately 2.5 +/- acres of land at the corner of Georgia and Bluff Avenue in North Augusta, South Carolina. After demolition of existing structures, the site will be utilized to develop a 70,000 SF +/- office building. The City of North Augusta will locate their municipal offices within the building on the first, second & third floors. The first floor will also house cultural/heritage exhibit space. The fourth floor will be shelled in for future expansion and used for special event space in the interim.

2. The design of the building will be required to conform to the 2003 IBC while meeting the concepts and visions of The City of North Augusta. The goal is to develop a local landmark building that "makes a statement" and reflects the values and heritage of the North Augusta community. The design should be timeless and remain appealing for many years and generations to come, with modest operational and maintenance costs. The building design will be flexible, accessible and open. The building should spark economic development that serves as a catalyst for continued investment and sets the quality standard for future development of the City of North Augusta.

3. The City of North Augusta will be the Owner of the project. The Boudreaux Group is the architectural firm that has been selected. Mr. Michael Frick of The Boudreaux Group will be the sole contact for the RFP process. He can be reached at 803-799-0247.

4. The purpose of this Request for Proposals (RFP) is to outline the scope of the project, general qualification requirements and the process which will be utilized by The City of North Augusta to select a contractor for the work. Written responses to the RFP are required from each general contractor and must be complete and in order for a prospective contractor to be considered for selection.

5. The City of North Augusta embraces the benefits to be gained through selecting a contractor at the beginning of the design phase through the process outlined herein. It is anticipated that the contractor's early involvements in the design process will reduce final costs through intense planning and value engineering, enhance project schedule performance through effective project planning and management, allow for owner participation in subcontractor selection and as a result, eliminate change orders that are not owner-generated.

6. Responses to the RFP are due at 12 p.m. on Friday, February 24th, in the offices of The Boudreaux Group on the second floor of 1200 Park Street, at the corner of Gervais and Park Street, Columbia, S.C 29201. The mailing address is: The Boudreaux Group, Attention: Michael Frick, P.O. Box 5695, Columbia, SC 29250.

Scope of Work/Qualifications

1. The contractor's scope of work will include active participation in Design Development, plan review, value engineering and estimating. Construction responsibilities will include construction of a 70,000 SF +/- office building complete with related surrounding site development and access. The initial scope will tentatively include the shell building and 47,000 SF of municipal office area upfit. Demolition of existing structures will be outside the scope of work.

2. The contract form to be used will be AIA Document A111 – Standard Form of Agreement Between an Owner and Contractor where basis of payment is the Cost of the Work Plus a Fee with a Guaranteed Maximum Price.

3. The contractor is required to submit, along with qualifications requested herein, a fee proposal, a list of costs typically included in general conditions and the typical percentage of these costs as compared to the overall project, and cost (if any) for pre-construction services.

4. The successful contractor must be bondable in an amount equal to the total project cost.

5. Each contractor is required to submit a staffing plan for the project to include resumes for the key members of the proposed management team. If selected, contractor's substitutions of proposed team members will require prior approval by the Owner and Architect.

6. The successful firm and its subcontractors will be required to provide proof of insurance coverage to include, but not limited to, the following:

   A) Commercial and general liability- not less than Fifteen Million Dollars ($15,000,000.00)
   B) Automobile liability- not less than Two Million Dollars ($2,000,000.00)
   C) Workers compensation- not less than Five Hundred Thousand Dollars ($500,000.00)

Selection Process

1. It is the intent of The City of North Augusta to select a contractor who in the sole opinion of The City of North Augusta and its representatives can best carry out the work and interface successfully with the other project team members. Criteria which will be heavily weighed in the evaluation and selection process include:

   A) Experience in construction of similar projects
   B) Qualifications and experience level of key personnel to be assigned to the project
   C) Design/build and/or "partnering" experience
   D) Financial strength
   E) Availability
   F) Chemistry between key contractor personnel and other project team members
   G) Proposed fees and general conditions

2. Each firm's written response will be reviewed and within three weeks of the date set for receipt of responses, The City of North Augusta intends to shortlist a minimum of three and a maximum of six, qualified General Contractors for presentation interviews based on RFP's submitted. The presentation interview requirements will be outlined in the shortlist notification to the prequalified General Contractors. The City of North Augusta reserves the right to reject any submittals which in their sole opinion does not comply with their objectives for the project.

3. It is important to note that contractor selection will be based upon a combination of qualifications, fees and general conditions. Final selection will be contingent upon The City of North Augusta and the contractor reaching an agreement to the terms and conditions of the contract documents.

Project Schedule

For the purpose of this RFP, the following is the projected schedule:

TASK	DATE
Request for Qualifications from GC's	Feb 06'
Select GC	March 06'
Complete Schematic Design	April 06'
Set Budget	May 06'
Design Development	August 06'
Early Site Package	September 06'
Early Foundation & Steel Package	November 06'
Construction Documents Complete	January 07'
Finalize Guaranteed Maximum Price	February 07'
Construction Substantially Complete	December 07'

16 Mo's

Upon being selected, the contractor will be required to prepare a proposed project schedule based upon initial review of design concepts.

REQUIRED SUBMITTAL INFORMATION

Qualified General Contractors with an interest in this project should submit six copies of the required submittal information listed below:

1. Completed Contractor's Qualification Statement, AIA Document A305
2. Contractor's license number and qualifying party
3. Firm's organization chart and total number of employees, differentiating field personnel and management
4. List and qualifications of key persons who would be assigned to the project, including senior management or principal(s) of firm, project manager and superintendent.
5. Description of experience of firm in projects similar to the municipal building for the City of North Augusta.
6. Description of experience in partnering/negotiated projects, to include the annual percentage of negotiated versus competitive bid work.
7. Minimum of five (5) references related to projects, including owner, owner's representatives, architects, engineers, major subcontractors, major material suppliers, etc.
8. Current and projected work of firm as it relates to the firm's ability to comply with the schedule for this project.
9. Description and illustrations of firm's completed projects related to this project. (Project description sheets in AIA Document B431, Architect's Qualification Statement, are a guide to desired information.)
10. Statement of bonding capacity from firm's bonding company and banking references.
11. Experience modification rate.
12. List and explanation of any current claims or suits in which the firm and/or consulting team is involved.
13. Dollar value of volume of work completed annually over the past three years.
14. Description of contractor's program for:

A) Quality control.
B) Safety.
C) Drug testing plan.

15. Proposed fees.

16. List of items to be included in project as General Conditions.

Appendix 3 – Design-Build Survey